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OF THE

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EYE, EAR, NOSE, AND THROAT NUMBER

Vol. 50, No. 8 | 212 East Ohio St., Chicago 11, Ill. | April, 1951

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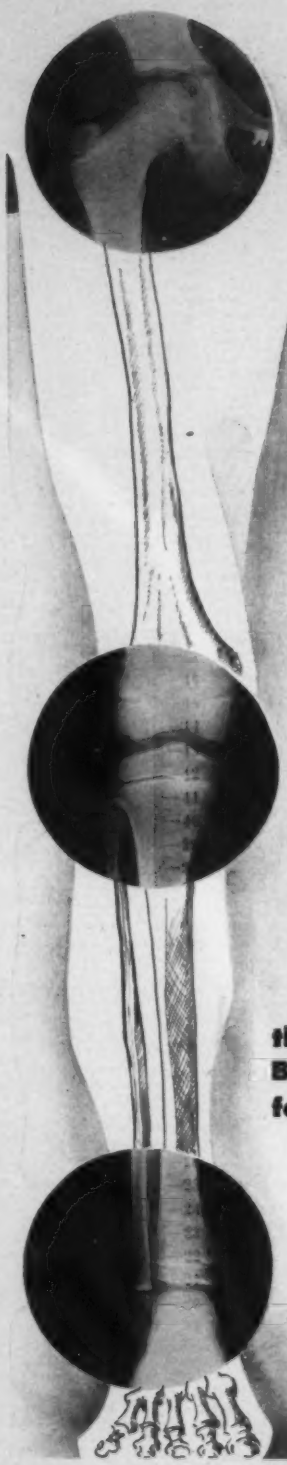

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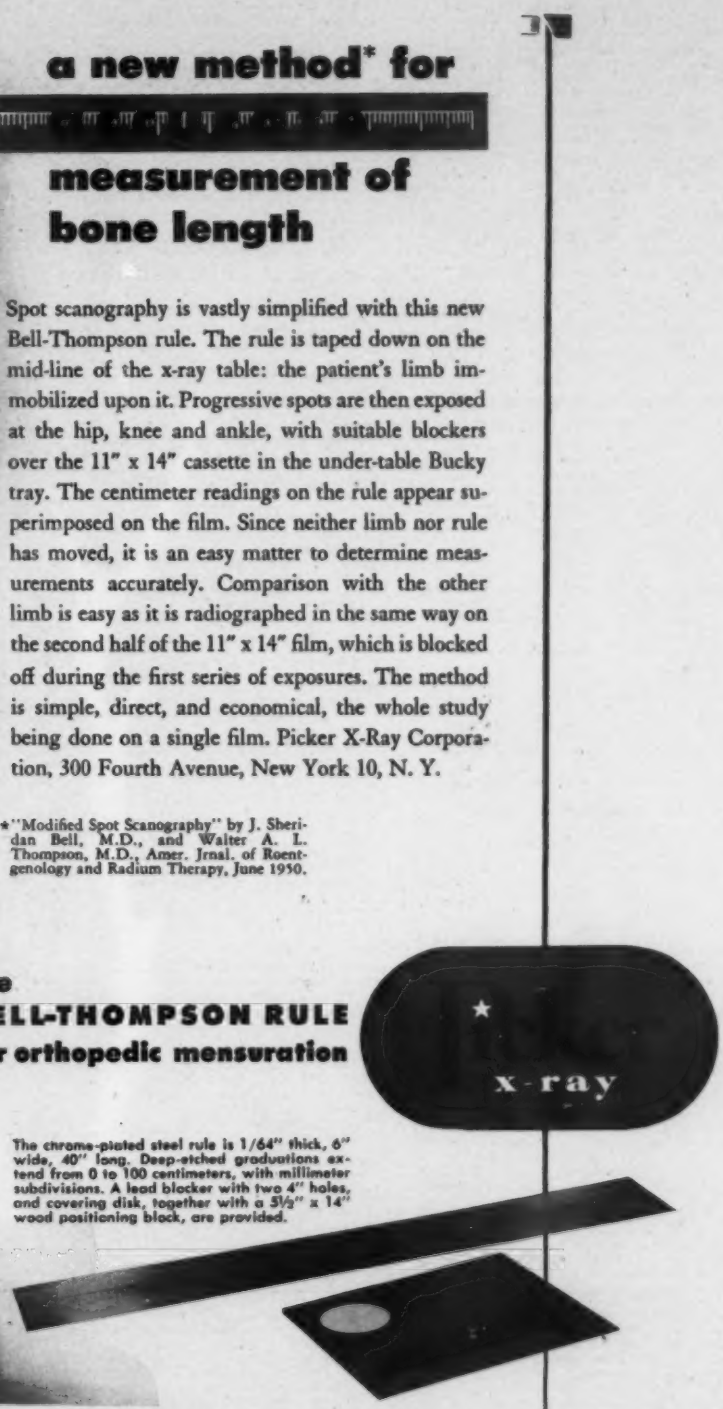

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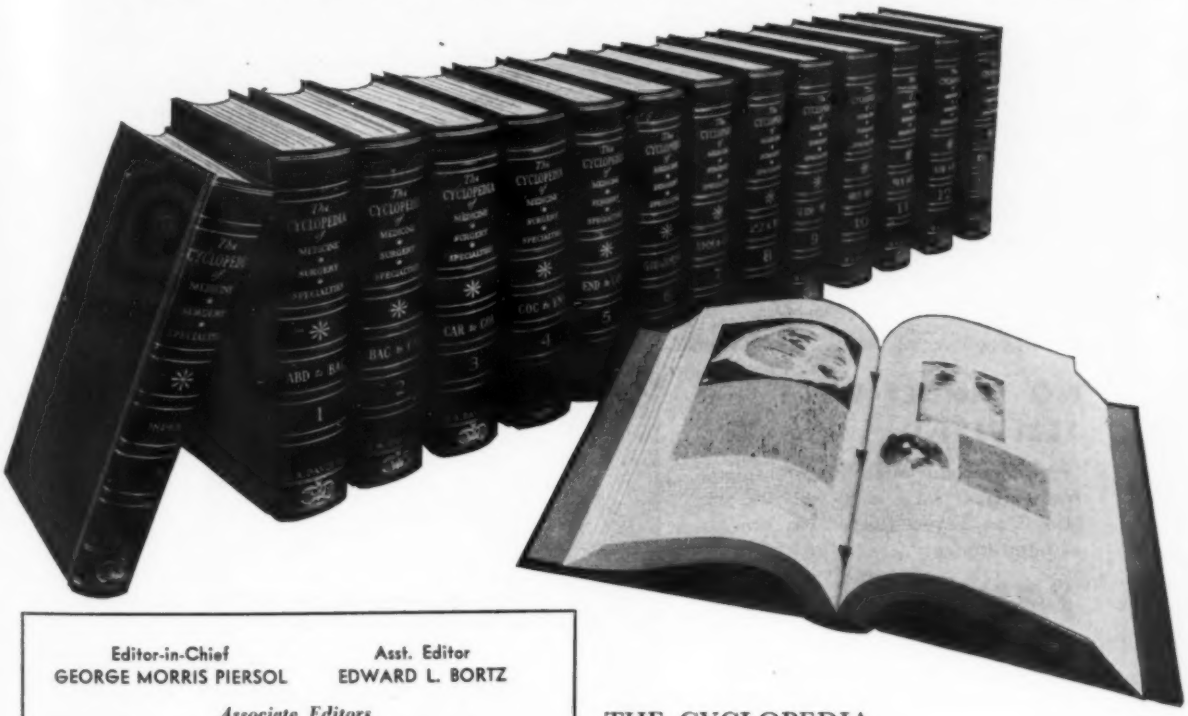

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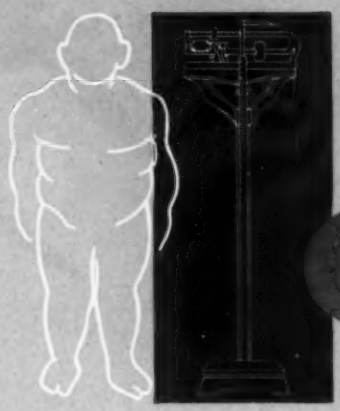

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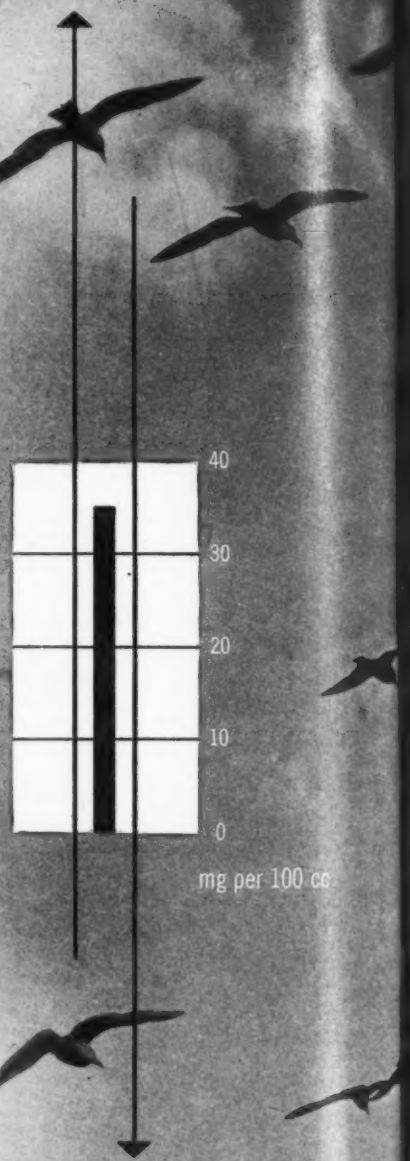

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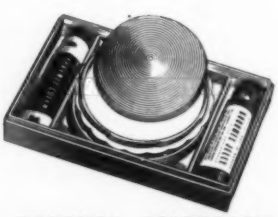

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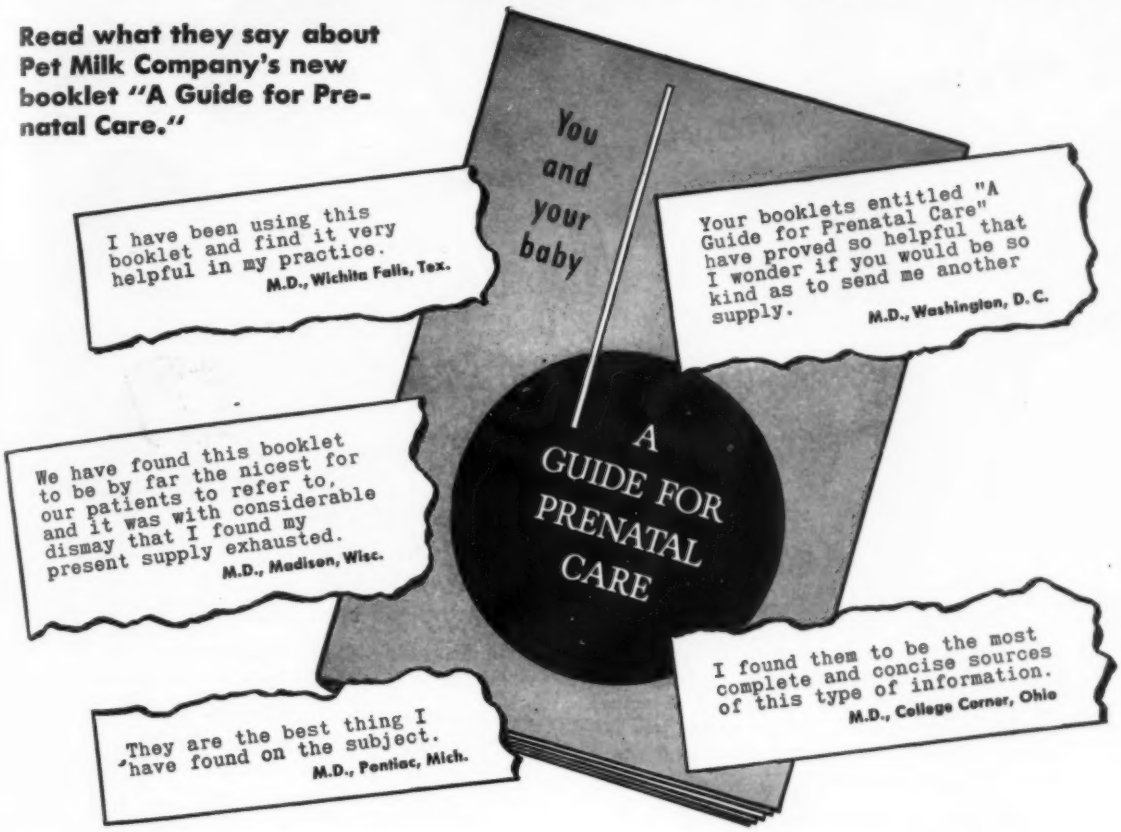
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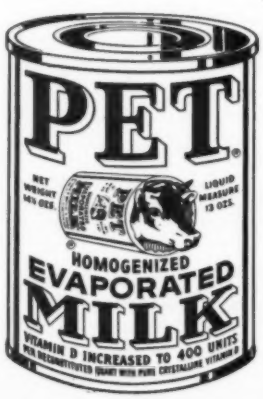

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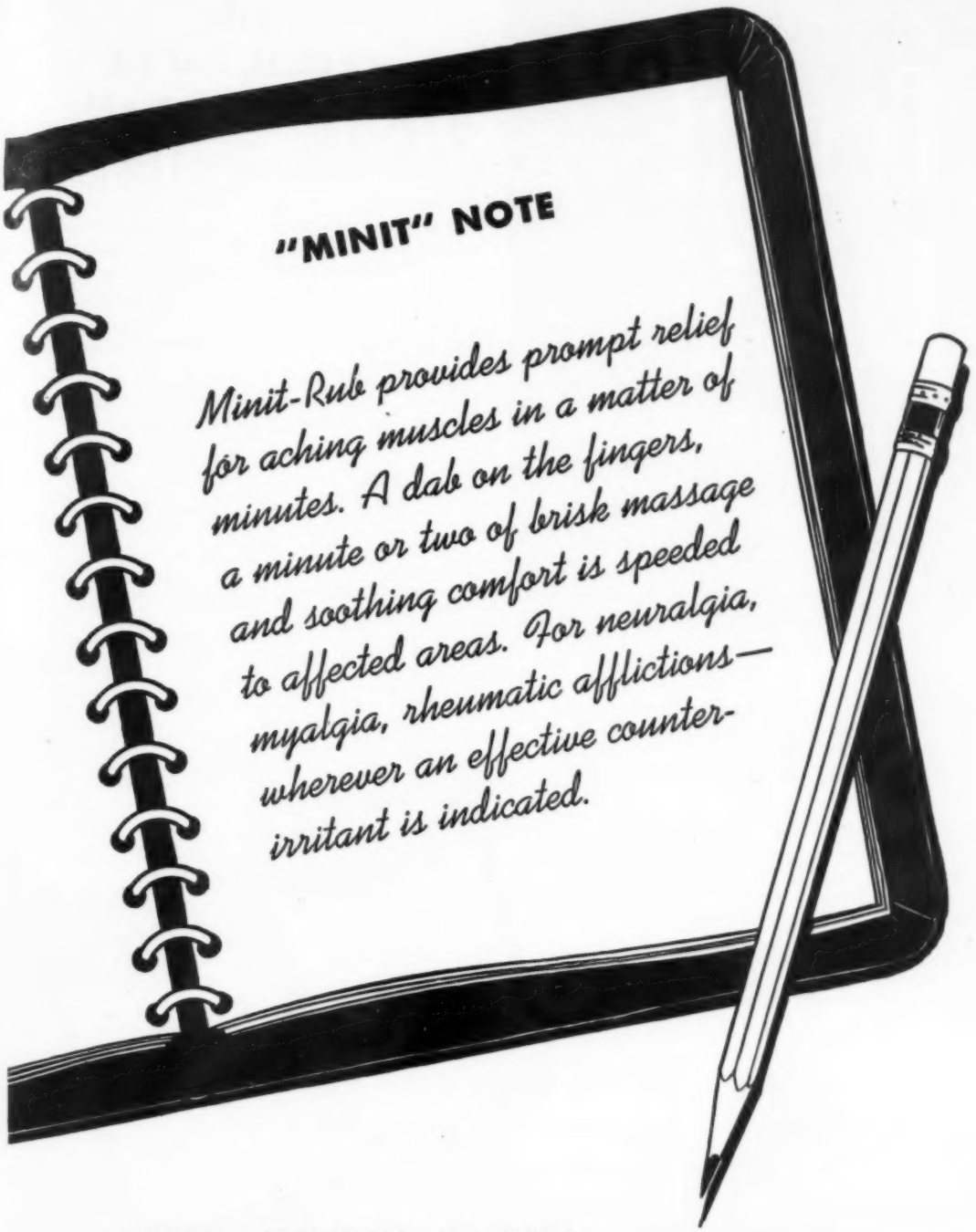
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STAINLESS • GREASELESS • VANISHING

MINIT-RUB

THE MODERN RUB-IN

PRODUCT OF BRISTOL-MYERS

19 WEST 50 STREET, NEW YORK 20, N. Y.

Cereal Lactic

Now in TWO FORMS

✓ IMPROVED VITAMIN

✓ ANTACID & ADSORBENT

THE CEREAL LACTIC FORMULA

The Cereal Lactic (Antacid and Adsorbent) formula is produced from the Cereal Lactic basic culture which contains lactobacillus organisms. Capable of retaining its lactic acid content over a long period of time, this basic culture also contains EIGHT essential enzymes.

Cereal Lactic (Antacid and Adsorbent) is produced by the addition of a very effective combination of alkalinizing agents to our basic culture.

To you who are versed in therapeutics, the correctness of the Cereal Lactic (Antacid and Adsorbent) formula is readily apparent:

Magnesium Trisilicate
Colloidal Kaolin
Calcium Carbonate
Aluminum Hydroxide
Cereal Lactic Basic Culture

Physicians' samples and complete information available upon request.

All over the country, thousands of physicians agree that both forms of Cereal Lactic effectively combat Gastro-intestinal disorders. Cereal Lactic in both forms has been prescribed over 10,000,000 times by the profession . . . the true test of confidence.

Cereal Lactic (Improved Vitamin) formula—serves effectively against gastro-intestinal disorders when hyperacidity and flatulence are not symptoms. It supplies needed lactic acid organisms, vitamins as well as EIGHT essential enzymes.

Cereal Lactic (Antacid and Adsorbent) formula — brings welcome relief to gastro-intestinal sufferers when hyperacidity and flatulence *are* symptoms.

CEREAL LACTIC CO.
WOODWARD, IOWA

almost

"time heals all wounds"

But consider *resistant* wounds or lesions which linger despite the usually adequate measures: **indolent ulcers**
malodorous fistulas
infected burns
stubborn dermatoses

Chloresium

therapy

gives time and the physician a helpful adjunct in these cases.

Clinical investigations have demonstrated the beneficial effects of CHLORESIUM (brand of water-soluble chlorophyll derivatives) in facilitating normal tissue repair:

1 **wounds quickly acquire a healthy granulating appearance**

2 **foul-smelling wounds are consistently and rapidly deodorized**

3 **in burns and dermatoses, helps bring about normal tissue repair and epethelization**

4 **non-toxic, bland and soothing**

bibliography

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CHLORESIUM Ointment in 1 oz. and 4 oz. tubes;
CHLORESIUM Solution (plain) in 2 oz. and 8 oz. bottles

RYSTAN COMPANY, INC • MT. VERNON, NEW YORK

NOW PROOF... in an instant, Doctor, PHILIP MORRIS are LESS IRRITATING

Just Make This Simple Test:

1 ... light up a **PHILIP MORRIS**

Take a puff—DON'T INHALE. Just s-l-o-w-l-y let the smoke come through your nose. Easy, isn't it? AND NOW...

2 ... light up your present brand

DON'T INHALE. Just take a puff and s-l-o-w-l-y let the smoke come through your nose. Notice that bite, that sting? Quite a difference from PHILIP MORRIS!

YES, your own *personal experience* confirms the results of the clinical and laboratory tests.* With proof so conclusive, would it not be good practice to suggest PHILIP MORRIS to your patients who smoke?

PHILIP MORRIS

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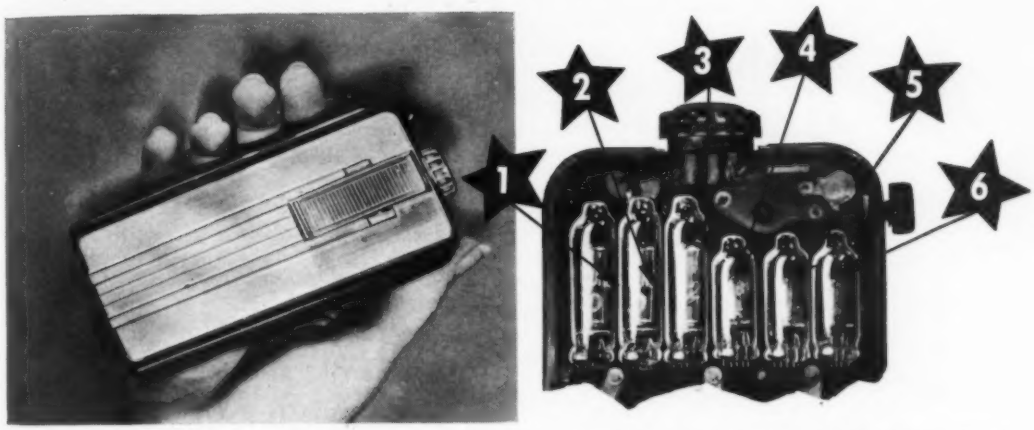
*Proc. Soc. Exp. Biol. and Med., 1934, 32, 241-245; N. Y. State Journ. Med., Vol. 35, 6-1-35, No. 11, 590-592; Laryngoscope, Feb. 1935, Vol. XLV, No. 2, 149-154; Laryngoscope, Jan. 1937, Vol. XLVII, No. 1, 58-60

NOW—the 6-TUBE SONOTONE POWERHOUSE

brings hearing to the severely deafened



Usable hearing — that is what the new Sonotone "966" will bring to three classes of your hard-of-hearing patients: (a) those whose losses are as high or higher than 80 decibels, who do not wear a hearing aid because none now existing can help them; (b) those hearing aid users whose deafness has progressed beyond the ability of their aid to help them; and (c) other users who are inadequately served by their present equipment.

Why is this true? Because the *6-tube* circuit provides *ten times the power* of the average hearing aid — the power needed for those whose residual hearing is so low that they had never hoped to hear again, power that reaches whatever useful hearing is left.

NOT 3 BUT 6-TUBE POWERED

Powerful as the "966" is, the power is *controlled.* This new aid is readily adjusted to suit the individual. Extra loud sounds are modulated automatically. There is a tolerance control, an internal adjustment which gives a cut-off point beyond which further increase in volume is automatically limited. A bifocal control—adjusted by the wearer of the instrument—reduces background noise. The Sonotone external microphone banishes the annoying "sh-sh" of "clothes-rub."

The "966" is suitable for air and most particularly for bone conduction. Tell your severely deafened patients about this new way of coming back into the hearing world.

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Sonotone is unique among hearing aid manufacturers in designing and making its own vacuum tubes, ear receivers and other important elements in its aids.

A request on your prescription blank will bring detailed information on the remarkably powerful Sonotone "966."

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they deserve the best . .

Implicit in a happy healthy childhood is maximal nutrition—and one of the essential dietetic guideposts to vigorous adulthood is adequate vitamin C[1,2,9] (¼-4 oz. for infants up to 1 year;[10,11] 4-8 oz. for older children).[4] Fortunately, most every youngster likes the taste of Florida orange juice and the "lift" its easily assimilable fruit sugars* provide.[6] It is well-tolerated and virtually non-allergenic.[3] And, under modern techniques of processing and storage—it is possible for citrus fruits and juices (whether fresh, canned or frozen) to *retain their ascorbic acid content,[5,8] and their pleasing flavor,[7] in very high degree and over long periods.*

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Citrus fruits—among the richest known sources of Vitamin C—also contain vitamins A and B, readily assimilable natural fruit sugars, and other factors, such as iron, calcium, citrates and citric acid.

. . . plenty of citrus fruit

References

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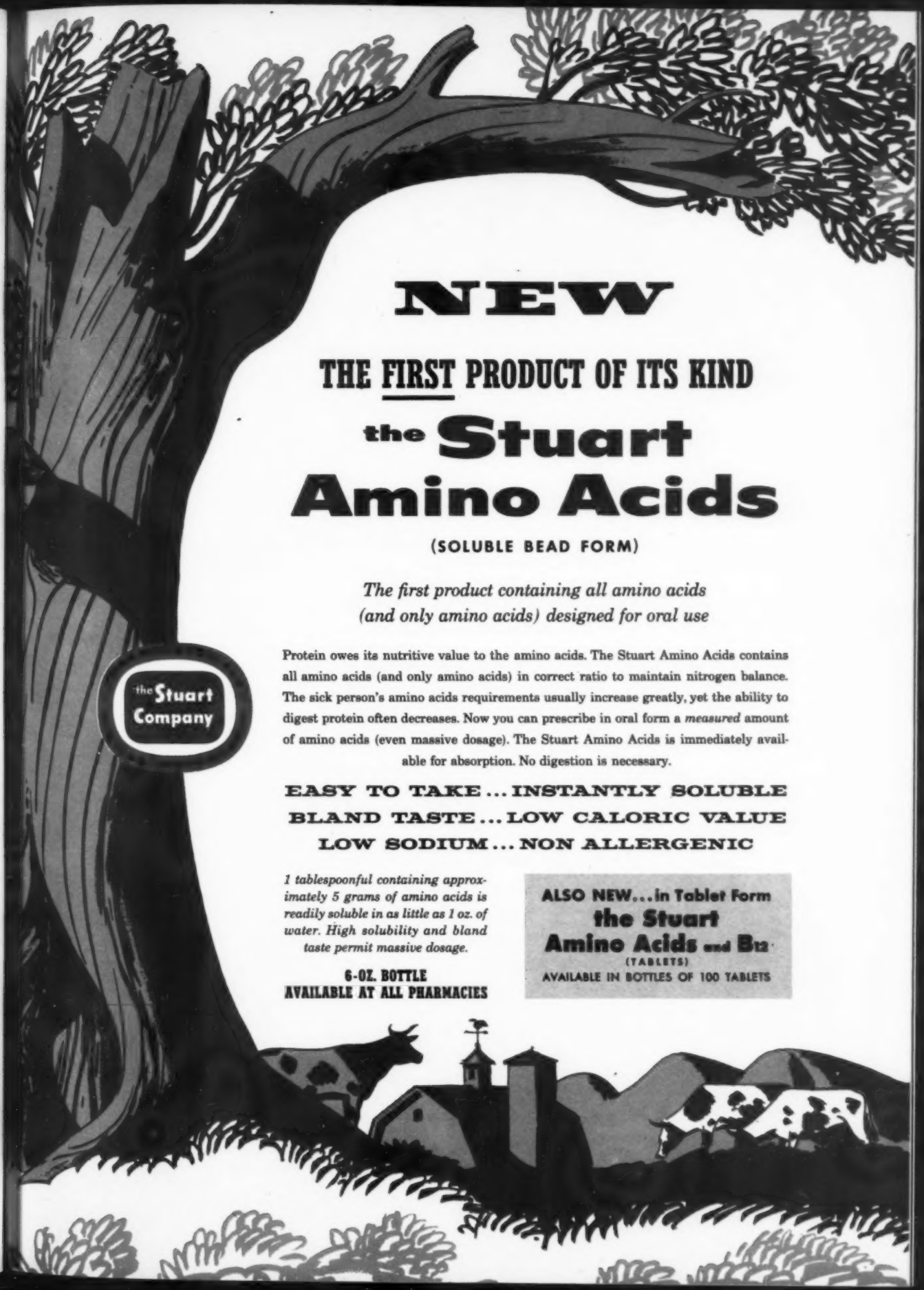
FLORIDA

Oranges • Grapefruit

Tangerines



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the Stuart Amino Acids

(SOLUBLE BEAD FORM)

The first product containing all amino acids (and only amino acids) designed for oral use

the Stuart Company

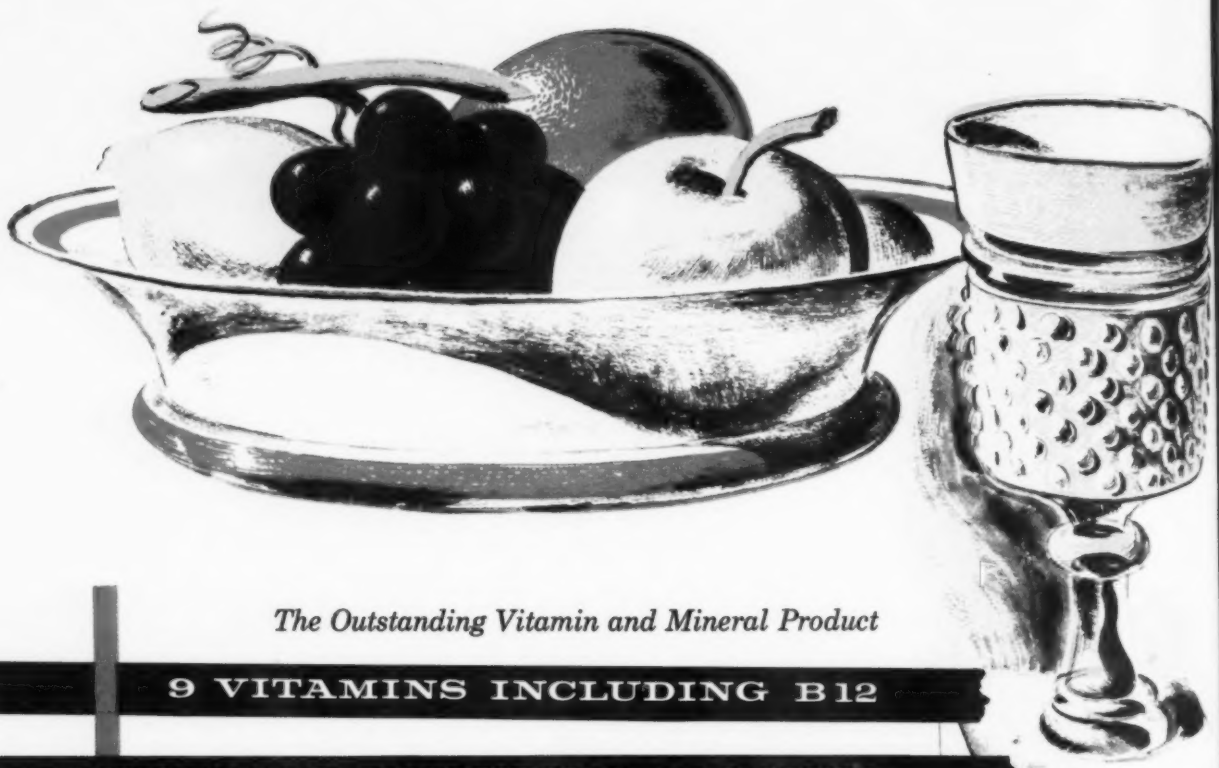
Protein owes its nutritive value to the amino acids. The Stuart Amino Acids contains all amino acids (and only amino acids) in correct ratio to maintain nitrogen balance. The sick person's amino acids requirements usually increase greatly, yet the ability to digest protein often decreases. Now you can prescribe in oral form a *measured* amount of amino acids (even massive dosage). The Stuart Amino Acids is immediately available for absorption. No digestion is necessary.

EASY TO TAKE ... INSTANTLY SOLUBLE
BLAND TASTE ... LOW CALORIC VALUE
LOW SODIUM ... NON ALLERGENIC

1 tablespoonful containing approximately 5 grams of amino acids is readily soluble in as little as 1 oz. of water. High solubility and bland taste permit massive dosage.

6-OZ. BOTTLE
AVAILABLE AT ALL PHARMACIES

ALSO NEW... in Tablet Form
the Stuart Amino Acids and B_{12}
(TABLETS)
AVAILABLE IN BOTTLES OF 100 TABLETS



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11 MINERALS INCLUDING CALCIUM

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Bottles of 100 tablets

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LOW COST TO PATIENTS

WHETHER THE REASONS ARE PHYSICAL OR PSYCHOLOGIC..

When for a physical or psychologic reason, the physician decides to depend on a spermatocidal jelly to protect the patient, he cannot do better than prescribe the "RAMSES"* Vaginal Jelly† Set No. 3.

Used as directed, the plastic applicator deposits 5 cc. of "RAMSES" Vaginal Jelly over the cervical os.

The cohesive and adherent properties of "RAMSES" Vaginal Jelly are of such high degree that the cervix remains occluded for as long as ten hours after coitus. "RAMSES" Vaginal Jelly, with its adjusted melting point, is not excessively lubricating or liquefying. "RAMSES" Vaginal Jelly exceeds the minimum spermatocidal requirement of the Council on Pharmacy and Chemistry of the American Medical Association.

AVAILABLE in a regular 3-ounce tube and an economy-size 5-ounce tube.

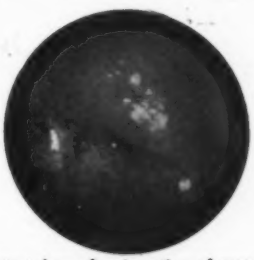

Photo taken after insertion of "RAMSES" Vaginal Jelly. Os occluded.

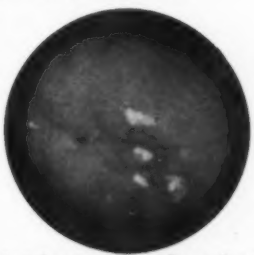

Photo taken ten hours after coitus. Occlusion still manifest.

Jelly stained with nonspermatocidal concentration of methylene blue for photographic purposes.

gynecological division

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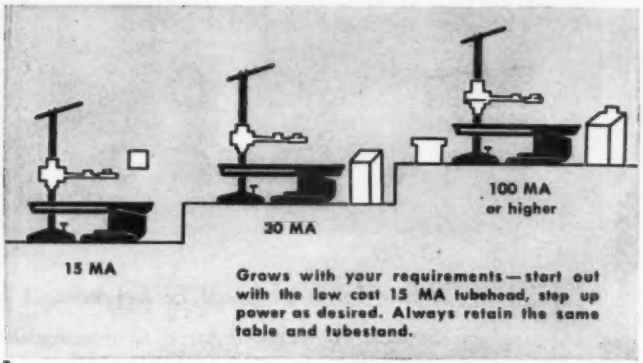
quality first since 1883

*The word "RAMSES" is a registered trademark of Julius Schmid, Inc. †Active Ingredients: Dodecaethyleneglycol Monolaurate 5%; Boric Acid 1%; Alcohol 5%.

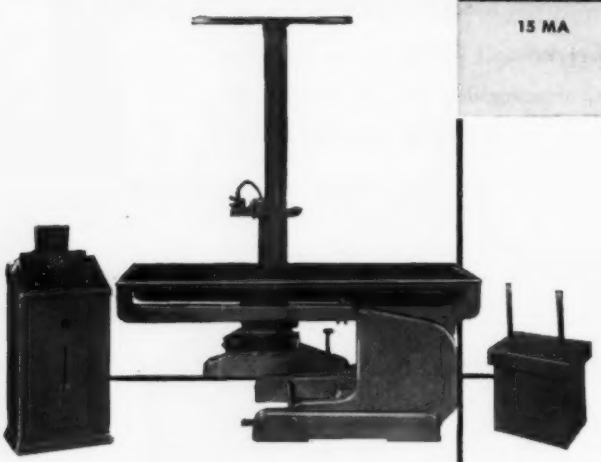
the Same tubestand . . .

the Same basic table . . .

for
15MA • 30MA • 100MA
200MA or HIGHER



Grows with your requirements—start out with the low cost 15 MA tubehead, step up power as desired. Always retain the same table and tubestand.



Keleket ADD-A-UNIT Combinations

ECONOMICAL LOW PRICE FOR COMPLETE FULL SIZE UNIT

Save money! Use the same Keleket tilt or non-tilt table and tubestand whether you require 15 MA, 30 MA, 100 MA, 200 MA or higher. Keleket ADD-A-UNIT equipment is finest equipment at lowest cost.

YOUR ORIGINAL INVESTMENT NEVER LOST

When stepping up to higher powered equipment, you save the cost of a new table and tubestand.

COMPLETE ADAPTABILITY

ADD-A-UNIT Combinations offer wide radiographic-fluoroscopic facilities. You get horizontal, trendelenburg and full vertical positions for all radiography, vertical and horizontal fluoroscopy.

Acclaimed by users who wanted . . . and got . . . more for their money, Keleket ADD-A-UNIT Combinations are a new approach to the use and purchase of full-size X-ray equipment. You start with the precise outfit that meets your present needs at lowest cost. From a basic combination for radiography and fluoroscopy you can advance to high voltage, high speed technics in radiography, spot film technics and superficial and medium therapy.

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Common Denominator:

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Common Treatment:

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PROTECTIVE ANTIPRURITIC OINTMENT

The special water-miscible base dries as a protective film. No bandaging required. Washes off easily.

Calamine, 10%; glycerine, 5%; benzocaine, 1%; phenol, 0.5%; menthol, 0.25%

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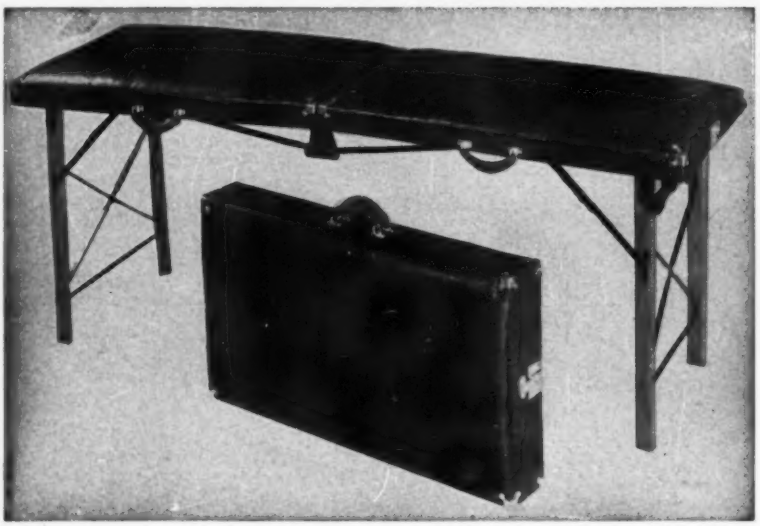
Treatment Tables and Stools Available



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Well constructed, strong. Will not tip or shake.
Easy to open and close. Length 69". Width 22". Height 27½". Carrying weight 32 lbs.
Walnut finish.
Simulated leather covering — brown, green or maroon.
Heavy standard padding (Paratex and felt.) 2" Paratex padding $10.00 additional. Shipping weight 35 to 37 lbs.

Price—$40.00

IDEAL STRAIGHT TABLE

Handmade by expert craftsmen.
Handsome, Strong, Durable, Comfortable.
Solid wood legs 3"x4".
Length 72". Width 22".
With drawer $5.00 additional.
With stirrups $10.00 additional.
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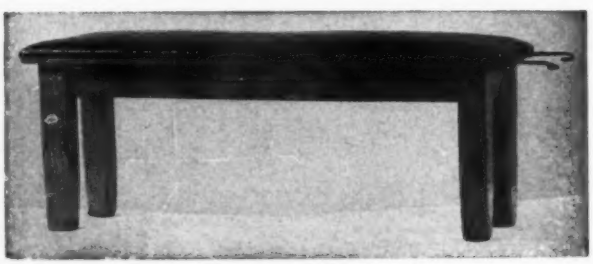
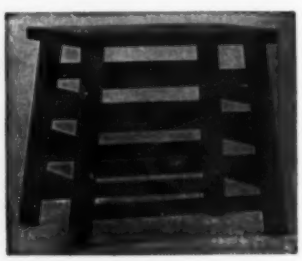


Solid Fir Wood.....$45.00 Solid Oak.....$50.00
Solid Walnut.....$65.00



IDEAL STOOL

Sturdy and well-made. Will not tip over.
Solid wood construction. Three and four rungs. Top made of one piece solid wood 1½" thick.
Polished or upholstered top. Length 22". Width 14". Height 20". Shipping weight 25 lbs.
Medium oak .....$28.00 Walnut $35.00

The manufacturers of these tables and stools give an unconditional guarantee on workmanship and materials. All items shipped f.o.b. from factory in Kirksville, Mo. Cash must accompany orders.

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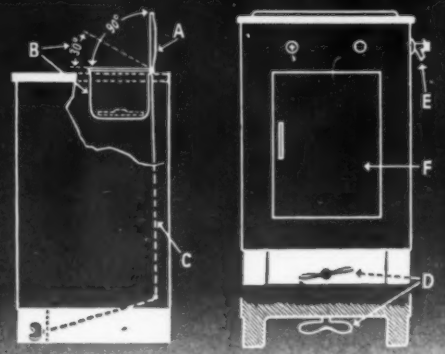

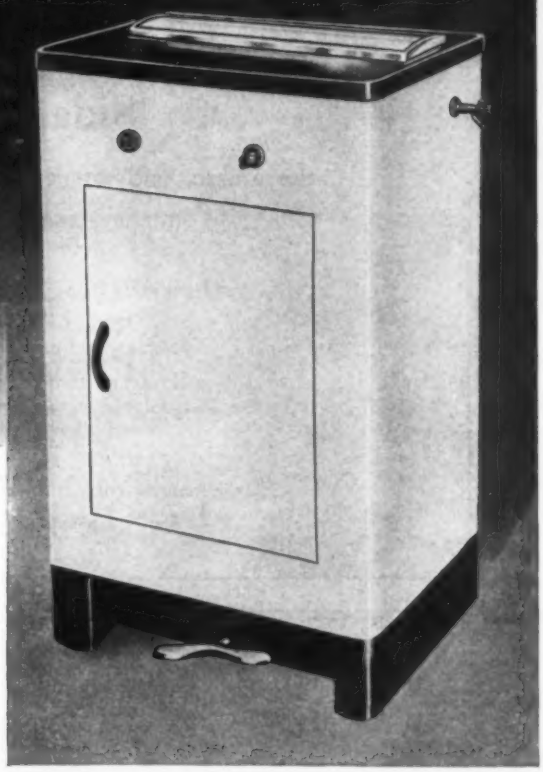

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SMALL INSTRUMENT STERILIZERS

combine *exclusive* highlights in design and construction that insure greater operating safety, convenience and long periods of satisfactory service.

(a) **Cover** — fabricated of stainless steel and elevating to full 90° angle to permit easy removal of tray without interference.

(b) **Cover** — elevates to 30° angle before immersed tray starts to raise, thus enabling operator to observe water level at all times to insure immersion of instruments.

(c) **Cover Elevating Mechanism** — Concealed entirely within cabinet, thus allowing cabinet to be placed flush against the wall.

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(e) **Drain Faucet** — a special screw-type valve which will not stick or score and may be taken apart instantly for cleaning without tools.

(f) **Doors** — Solid double-panel or glass, hung on fully concealed steel hinges, fitted with Bakelite handle, spring catches and rubber bumpers.

BURN-OUT-PROOF!
An automatic safety measure protecting both Sterilizer and instruments against possible damage due to depletion of water supply in chamber.

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SEND FOR A PHYSICIAN'S SAMPLE OF OUR
PROTEIN DIGEST No. 26

Sidamine Tablets
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the amino acid tablet—uncoated—but carrying 70% protein.
no dextrose or other carbohydrate filler.

In writing for samples, please give your degree.

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Send for details on a sound reducing regime and plan.

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CA-MA-SIL is an OUTSTANDING NEUTRALIZER and BUFFER in EVERY respect.

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Start the patient on 2 level teaspoonfuls in ½ glass of water, preferably warm or hot, both **before** and **after** each meal and at **bed-time**—also between meals if necessary.

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Where gastric hyperacidity is present, use one to three teaspoonfuls (or more) in ½ glass of water upon retiring and before breakfast.

NO UNDESIRED EFFECTS.

Insoluble — produces no systemic alkalization — no acid rebound.

Continued use entails no danger of:

Alkalosis — Nutritional deficiency — Irritation or blockage of the intestinal tract—Anorexia.

Study its factors, Doctor . . .

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A Special Magnesium Silicate (Not Trisilicate).
Calcium Carbonate.
Diammonium Hydrogen Phosphate.
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Saccharin.

NO SODA — NO ALUMINUM HYDROXIDE

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Neutralizes 38 times its volume or 110 times its weight of N/10 HCl over a period of 3 hours.

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Vitaminerals tableting department is no place for amateurs. Tableting technicians, with as much as twenty-seven years experience, operate these powerful but sensitive machines with that same expertness which characterizes all Vitaminerals operations, and is reflected in the year 'round uniformity of Vitaminerals products.

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Goldberger—Heart Disease

Its Diagnosis and Treatment

By EMANUEL GOLDBERGER, B.S., M.D.

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In every respect, this is a clinical monograph written for general practitioners who want an authoritative book that stresses *bedside diagnosis and treatment* of heart disease and related conditions. Dr. Goldberger never loses sight of the fact that in most cases of heart disease, a diagnosis can be made by such simple procedures as *inspection, palpation, percussion, auscultation, fluoroscopy* and *electrocardiography*. Simple bedside methods for the diagnosis of auricular fibrillation, a-v block, nodal rhythm and paroxysmal tachycardia are presented.

Full coverage is given to normal and abnormal electrocardiographic patterns, fluoroscopic and X-ray findings, and to the latest advances in the use of electrokymograms, ballistocardiograms, angiocardiography, and catheterization of the heart. *Cardiovascular findings in infants and children are detailed* and specific dose schedules are given. Methods of diagnosis and indications for operation of congenital heart disease are included. The discussions of *treatment* are complete. Dr. Goldberger includes anticoagulant therapy, ACTH and cortisone, as well as other proved and accepted therapeutic procedures.

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TRANSLUMBAR ARTERIOGRAPHY OUTFIT

PARKE G. SMITH, M.D.
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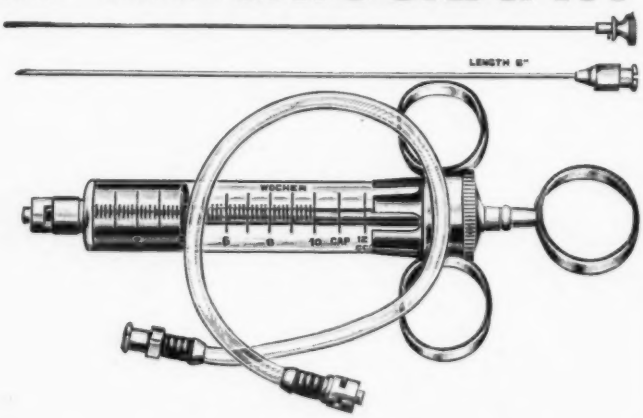

Translumbar Arteriography is used to demonstrate:

1. Anomalous vessels
2. Aberrant vessels
3. Renal blood supply
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7. Abnormal iliac and femoral arteries

The foregoing is a superficial list of the many advantages of translumbar arteriography. The equipment necessary to perform the operation is comparatively simple and inexpensive. It comprises a special, 12cc control syringe with a 6-inch long, 18-gauge needle to puncture the aorta. A length of plastic tubing with luer-lock ends is used to connect syringe and needle.

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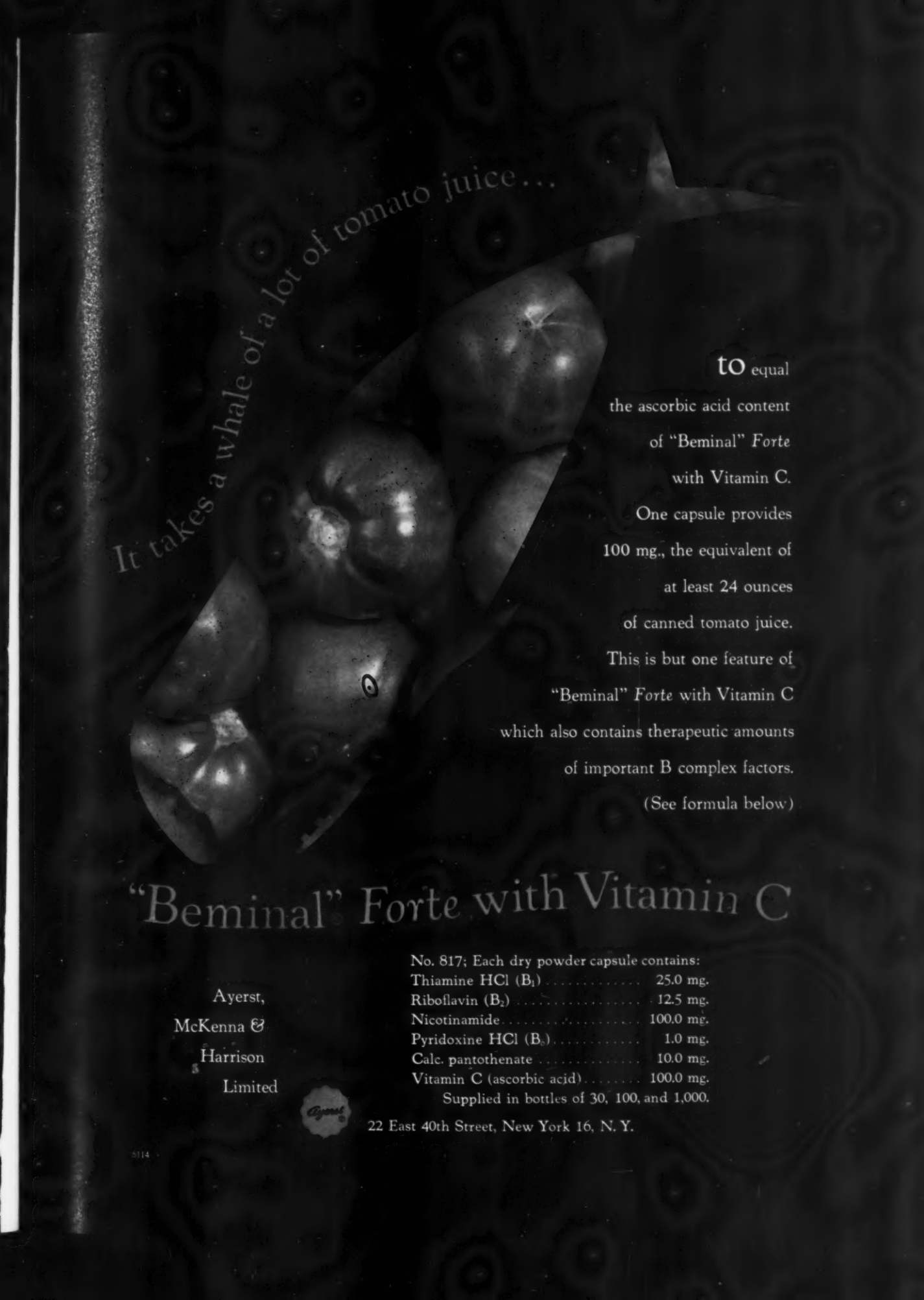
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the ascorbic acid content
of "Beminal" Forte
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One capsule provides
100 mg., the equivalent of
at least 24 ounces
of canned tomato juice.
This is but one feature of
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Thiamine HCl (B_1) ..... 25.0 mg.
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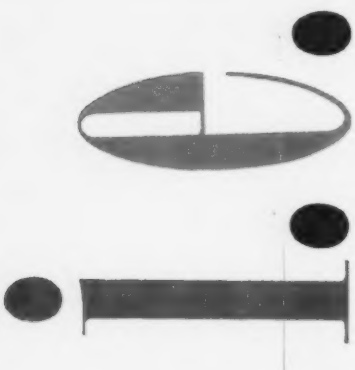

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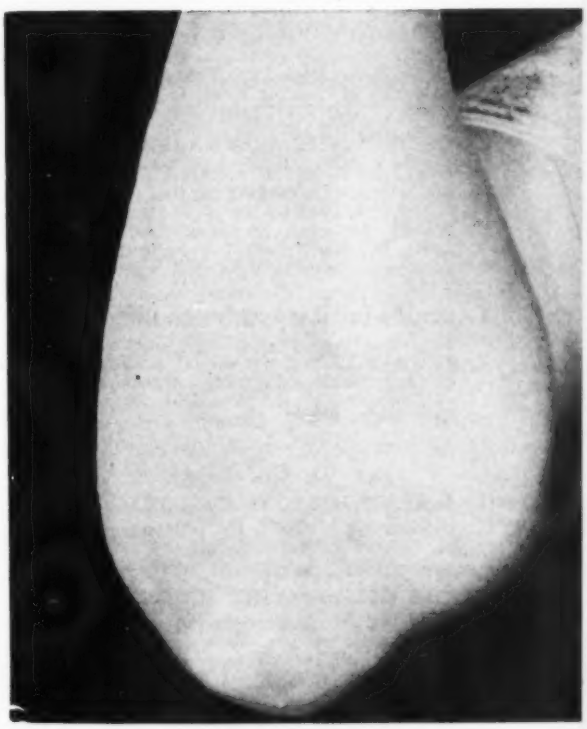

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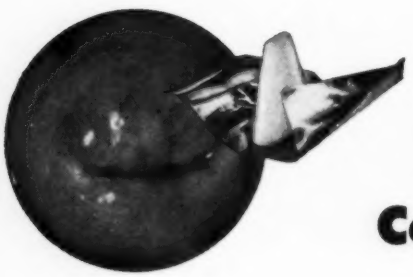

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Symposium*

An Approach to Skeletal Components in Health and Disease†

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INTRODUCTION

It has been the purpose of this study to determine the incidence of the "osteopathic lesion" in a group of young adults and to observe any correlations which may exist between incidence and location of the osteopathic lesion, on the one hand, and the general health of the individual, the position of the vertebral column and pelvis, and certain aspects of vegetative nervous system activity on the other.

The term "osteopathic lesion" has been placed in quotation marks since, although the recognition and treatment of this entity has been at the very core of the work and development of the osteopathic profession, general agreement as to its exact nature and its anatomical, physiological, and pathological characteristics has not yet emerged. To speak specifically, two osteopathic physicians, examining a patient independently, will agree on *areas* of lesion but may differ concerning the position and the motion of the structures involved. Apparently, agreement is reached on the *area* because covering and supporting tissues in lesion have fairly pronounced changes in texture and tenderness, while uncertainties due to the depth of osseous tissue and the extremely complex movement characteristics, particularly of spinal, rib, and pelvic joints, permit differences of opinion.

The possibility of agreement concerning the texture of tissues together with the correlation between certain tissue texture abnormalities and the state of irritation of parts of the segmentally related spinal reflex arc[1] led to a decision to limit this study to an analysis of the tissues which cover and support the bony framework of the vertebral column, the pelvis, and, to a limited extent, of the thorax.

METHOD

Since previous work has shown that a joint with normal tissue texture and no hyperesthesia also has a high reflex threshold, i.e., a major stimulus such as very heavy pressure is required to cause muscle contraction in the joint and, conversely, that a severely lesioned joint is characterized by abnormal tissue texture, hyperesthesia, and a low reflex threshold, the tissues were designated as follows:

a. Normal texture
b. Slightly abnormal texture
c. Moderately abnormal texture
d. Markedly abnormal texture
e. Severely abnormal texture.

To compensate, at least in part, for the subjective nature of examination by palpation, which involved interpretation and judgment, it was decided to have two physicians examine each subject and record their findings independently.

A uniform examination procedure was adopted. The cervical area was examined with the patient supine and the tissues across the posterior portion of the neck from the lower part of the skull to the seventh cervical evaluated. The area from the first to the third thoracic vertebrae and related ribs to the vertebral border of the scapulae were examined with the patient sitting. The other parts of the thoracic spine, the lumbar segments, the sacrum, sacroiliac joints, and the posterior portions of the gluteal masses were examined with the patient prone. The two physicians worked in different rooms and each made a chart of his observations. When each physician had completed his examination, the charts were compared, points of difference discussed, and the patient re-examined.

The texture of the following tissues was charted: (1) Tissues overlying the spinous processes, (2) the articular processes, (3) the angles of the ribs, (4) the tissues over the atlanto-occipital joints (right, left and mid-line), (5) the sacroiliac joints, and (6) the gluteal masses.

Chart 1 shows the grid that was used, together with the designations which indicate various degrees of tissue texture abnormality. Normal texture is represented by a blank space, and degree of abnormality by gradations in the density of shading.

*Presented at the General Sessions of the Fifty-Fourth Annual Convention of the American Osteopathic Association, Chicago, July 12, 1950.

†The research on which this paper is based was made possible by grants from the Research Fund of the American Osteopathic Association.

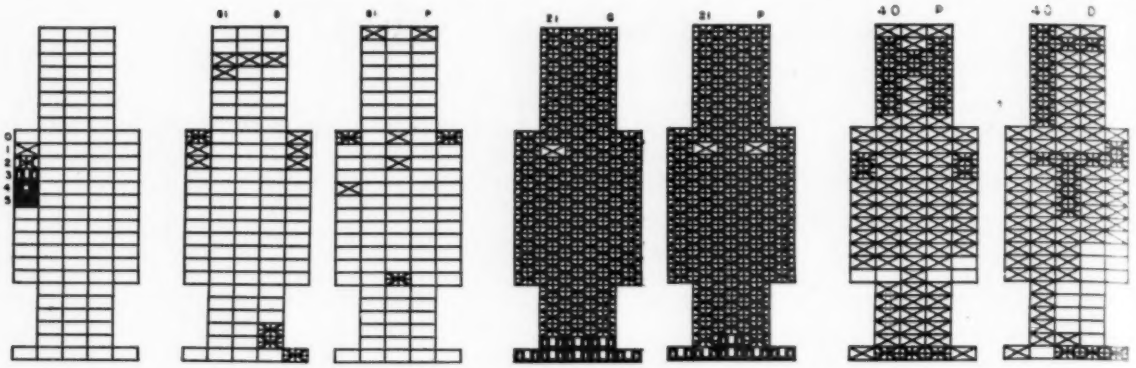


Chart 1 Chart 2 Chart 3 Chart 4

As reported last year,[2] the findings of two physicians who made and recorded the examinations independently and without knowledge of the history and physical findings, were in close agreement. Time does not permit a detailed analysis of such agreement and it will suffice to state that the agreement occurred in more than 80 per cent of the areas examined. The degree of agreement will also be evident from the subsequent charts.

As this work progressed, it became apparent that the most important dividing line between degrees of pathological tissue texture was between "slightly abnormal" and "moderately abnormal" texture change, since had the subjects been patients, the "normal" and "slightly abnormal" would not represent significant clinical entities while the "moderate," "marked," and "severe" abnormalities would be considered to warrant therapeutic attention. The original classification was maintained for the examinations, but, in considering these data, "normal" and "slightly abnormal" changes were combined in one group and "moderate," "marked," and "severe" abnormalities in another. The same high degree of agreement between examiners with this use of the data is maintained.

RESULTS

As might have been predicted, the group of subjects included a few individuals who presented almost no lesion pathology, a few who literally had lesions in all the areas examined, and a spread of varying degrees of lesion between the two extremes.

There were four subjects who had, in the opinion of both examiners, no more than 13 areas of tissue texture abnormality out of the 104 areas examined in each case. Each of these subjects was strong and robust, of the sthenic or hypersthenic habitus, and was completely free from symptoms of either functional or organic disease. Chart 2 shows the results of each physician's examination on one of these subjects. The others had similar findings.

Both examiners found minor changes in the upper cervical region, over the first ribs; one examiner found abnormality at the twelfth thoracic and the other on the right side of the lumbosacral junction. The predominance of normal areas and the agreement of the two examiners is obvious.

At the other extreme, there were three subjects who had, in the opinion of both examiners, more than 100 areas of tissue texture abnormality out of the 104 areas examined in each case. One of these is shown in Chart 3. This subject is a white married male, aged 28, who has an advanced case of hypertrophic spondylosis. Although his general health permits him to carry a full schedule most of the time, he has recurrent attacks of disabling pain throughout the entire back and centering at the lumbodorsal junction. Obviously, both examiners held the opinion that lesion pathology occurred throughout the vertebral column and pelvis. The entire back was extremely hyperesthetic.

Since there was virtually complete agreement of the two physicians regarding the four subjects who had few areas of texture abnormality and the three subjects who had abnormality throughout most of the 104 areas, and since the examiners had no knowledge of the history or clinical findings in any of the cases, it seems impossible to escape the conclusion that there is a direct relationship between the good "physical integrity," the normal tissue texture, and the absence of hyperesthesia in one group, and a similar relationship between the demonstrable clinical problem and the widespread tissue texture abnormality and hyperesthesia in the other group.

There are certain additional observations which should be made concerning the subjects at each extreme, that is, those with virtually no evidence of lesion and those with lesions in all the areas examined. As has been stated previously, the individuals in the group without lesions were robust and completely free from

Fig. 1

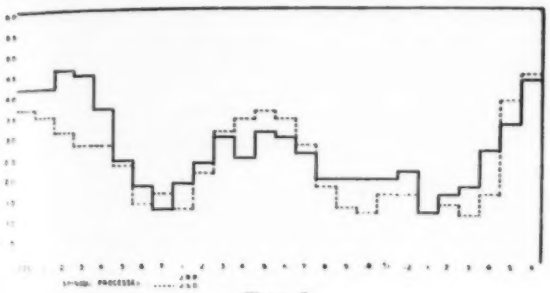


Chart 5

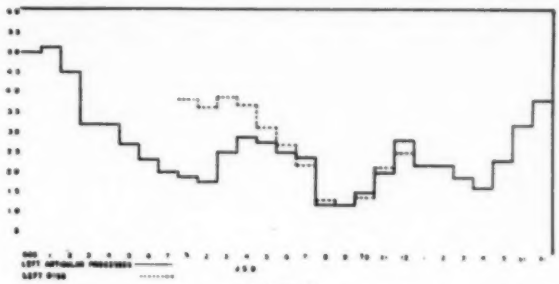


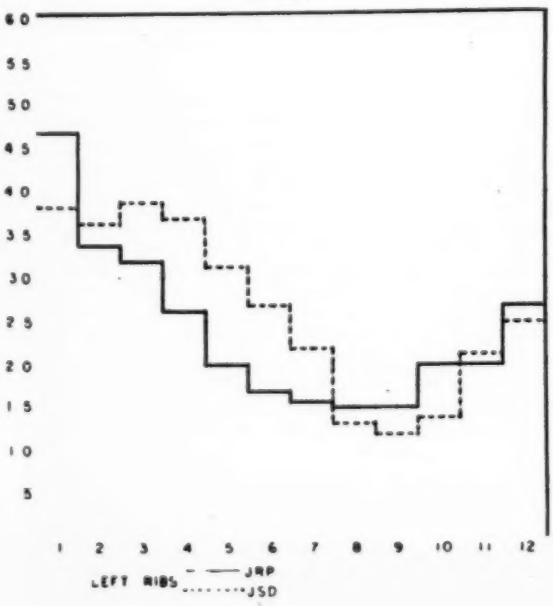
Chart 7

symptoms. At x-ray, it was found that the position and the weight-bearing characteristics of the vertebral column and pelvis were normal in three of the subjects. In the fourth, however, there was an anatomical short leg of 5/8 inch on the right side with a severe pelvic tilt and a convex side rotation of the lumbar spine to the right side. This is shown in Figure 1. The right femur head is low, the pelvis is tilted to the right, and the lumbar spine has convex side rotation to the right. Obviously, there are factors in this patient which permit him, at least up to this time, to enjoy excellent health and to have normal spinal cord reflex activity despite a severe weight-bearing abnormality.

The group with widespread lesion pathology, throughout the vertebral column and pelvis, had, in addition, symptoms, physical findings, and x-ray findings which differed from case to case, and which involved one or more systems. Of these three individuals, one showed organic change in the osseous portion of the vertebral column; the other two showed moderate positional abnormalities. It is apparent, in these cases, that a constitutional, or widespread, pathologic process is present.

In the intermediate group of subjects, there were some individuals who had and others who did not have symptoms and physical findings which correlated with lesion patterns.

Chart 6



An illustrative case of an individual with fairly marked lesions but with no symptoms or other evidence of disease is shown in Chart 4. This subject is a white, unmarried male, aged 28, who, although he is symptom free, has a leg length discrepancy of nearly 1 inch as a result of an old fracture of the femur. Here again, the examiners are in essential agreement. Since the blank spaces and those filled with single cross hatches represent normal or very slight pathology, it is obvious that the more severe lesions were localized in the cervical, midthoracic and lumbosacral areas.

Except in certain example subjects, the factors bearing on the correlation of findings in various systems are too complex to permit tabulation at this time. Studies leading to correlations of the findings of various examinations are being made and will be reported in the future.

The next series of charts shows the findings of two physicians, at independent examinations, as regards the incidence of tissue texture abnormality at each spinal segment in 61 subjects. These charts permit a further evaluation of the similarity of the findings of the two examiners and indicate the frequency with which abnormality was found at the various spinal levels.

In each of these charts the heavy line indicates the findings of one examiner and the light dashed line the findings of the other. The level of the curve at each segment represents the incidence of pathology. For example in Chart 5, which represents a study at the spinous processes in the group of 61 subjects examined, one examiner found 37 subjects and the other 42 subjects who had lesion pathology in the midline at the atlanto-occipital junction.

At the spinous processes the areas showing the highest incidence of lesion were the upper cervical region, the mid-dorsal segments, and the lumbosacral area. Although there were minor discrepancies between the findings of the two examiners, the peaks indicating the most frequently lesioned areas were essentially the same. The findings at the articular processes were approximately the same as those at the spinous processes. There are peaks showing a high incidence of lesion pathology at the upper cervical, midthoracic, and lumbosacral areas, and one examiner found an additional small peak at the lumbodorsal junction.

Chart 6 shows a high incidence of abnormality at the angles of the ribs on the left side in the upper thoracic areas. The right side showed similar findings. The contrast in the incidence of pathology at the ribs and at the articular processes is shown in Chart 7. The heavy line shows the incidence of pathology at the articular processes, the dashed line the incidence of pathology at the angles of the ribs.

DISCUSSION

The entity "palpable tissue abnormality," which is considered to be an important component of the osteopathic lesion, is not new. It has been recognized as a part of abnormal body mechanics and of visceral disease for a long time. Still[3] considered these tissue changes to be both etiological and sustaining factors in ill health. On the visceral side, probably the earliest "somatic component" of visceral disease to be recognized was rigidity of the back and abdominal wall which accompanies acute intraperitoneal infection. Mackenzie,[4] nearly 60 years ago, described "tender spines" in the upper thoracic region in cases of cardiac disease. Although it received little attention, the Report of the Subcommittee on Orthopedics and Body Mechanics of the White House Conference on Child Health and Protection, 1930[5] described the extremely high incidence of mechanical abnormalities in children and in general terms discussed important physiological consequences. Recently, surveys of several hundred rural school children[6] have revealed a very high incidence of weight-bearing and other mechanical abnormalities. These and other reports leave no question as to the existence, and the importance, of abnormality in the framework of the body. The present report considers incidence, location, and severity with which tissue texture changes, characteristic of spinal cord irritability, occur.

The precise nature of the mechanisms which account for palpable alterations in somatic tissues is not known. However, there is sufficient evidence concerning them (1) to have a bearing on practical diagnosis and therapy and (2) to justify the kind of speculation which might lead to fruitful investigation in the future.

Korr,[7] Drucker,[8] and Grumbach,[9] in excellent reviews of the clinical and physiological literature, have discussed observations which indicate that the disturbances under consideration have a neurophysiological basis and that certain elements are involved. These elements appear to be (1) an afferent bombardment from a locus of pathology (including dysfunctions of a reversible nature), (2) a facilitation in the internuncial system and at the motoneurons, (3) motor "imbalance" which leads to (4) disturbances in other tissues in the involved segment. Obviously (1) the original locus and (4) disturbances in other tissues of the same segment represent what might be considered primary and secondary sources of afferent bombardment.

While a step-by-step tracing of events from (1) to (4) has not been possible, the demonstrations of the correlations between low thresholds for muscle contraction, for pain and palpable tissue abnormalities, and the more recent observations[10] concerning segmental differences in vegetative hyperactivity and hypoactivity appear to leave no question that the basic elements described above exist in a relationship which can be schematically diagramed (Fig. 2). In this diagram, the "primary" afferent bombardment has been termed an "X bombardment" since it may arise from any part (or parts) of the involved segment, or from the higher centers. The stippled areas indicate the probable location of synaptic facilitation. The dashed lines represent a "secondary" bombardment or "feedback" which results from the motor facilitation. As has been demonstrated in physiological experimentation, the size of the pool of facilitated neurons and the level of facilitation (subthreshold or threshold)

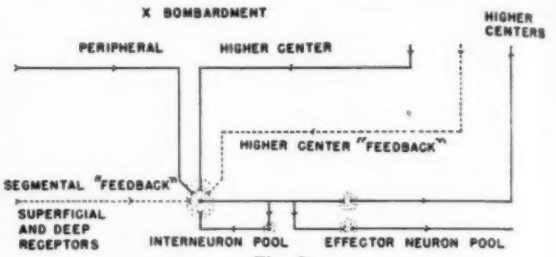


Fig. 2

is determined by the number of afferent or higher center impulses reaching the pool. Consequently, a reduction in the impulses reaching the pool, regardless of whether they come from primary or secondary factors, will have a therapeutic effect. This provides the best, and perhaps the only, approach to an understanding of many clinical observations of which a few will be cited.

In appendicitis, an important finding is a painful rigidity of the tissues in the lower right abdominal quadrant. This rigidity is apparently secondary since it is eliminated, dramatically, when the diseased appendix (the primary focus) is removed surgically. However, as Judovich and Bates[11] point out, if the diagnosis was not correct, the painful rigidity will persist. They have found that under such circumstances clinical improvement is frequently attained by locating and removing the primary factor (the "X-bombardment") *or* by blocking the afferent inflow from the secondary disturbance (the "feedback") with a local anesthetic.

Related to this are the observations of Speransky[12] and Ginsburg.[13] The Russian group, while investigating "the functions and behavior of the nervous system in the origin and course of diseases and injuries," made extensive studies of experimental and clinical lobar pneumonia. Ginsburg considered that ". . . a relationship exists between lobar pneumonia and nerve changes in the basal ganglia of the brain and the cervical and thoracic segments of the spinal cord." He attempted to alter the course of lobar pneumonia (clinical) by affecting the nerves at the cervicodorsal areas through intradermal procainization. An analysis of 49 cases of lobar pneumonia established that:

> . . . the temperature began to fall and reached normal 12-48 hours after novocaine infiltration. The febrile period was shortened and the pneumonia ran an unusual course of two to four days' duration. The type of defervescence also differed, for in 17 cases the temperature curve resembled one of atypical lysis, while in 30 cases it followed a more critical course. The fall of temperature was not accompanied by prostration or collapse. In 47 patients the effect of the new method of treatment also hastened resolution of the pathologic process. Only one of the 49 cases died. This was a case of bilateral pneumonia, in which novocaine infiltration was administered on the twelfth day of illness when other methods of treatment had failed.

It is both interesting and important that, although Ginsburg did not comment about it, the area infiltrated is, in lobar pneumonia, one which invariably has evidence of "palpable tissue abnormality" and of low reflex threshold for pain and muscle contraction. Equally significant is that comparable results have often been noted in cases where the area procainized by Ginsburg has been treated by "relaxing" osteopathic manipulative treatment. While the pathogenesis and the etiological patterns in pneumonia remain contro-

versial, these observations indicate that the modification of segmentally related somatic tissues has a profound and beneficial effect on the infectious process which involves the lung. Experience indicates that this is not an isolated phenomenon but, instead, is a basic element in a large number of so-called visceral diseases.

The reasons which account for certain areas having a high incidence of somatic abnormality cannot be determined until it is possible to make direct studies of the afferents involved. However, the frequency with which mechanical abnormality is seen,[5,6] plus the relative absence of visceral dysfunction or disease found in the group being reported, gives strong indication that the bombardment arises as a result of abnormal weight-bearing stresses which are part of mechanical and postural errors.

SUMMARY

1. Two osteopathic physicians can agree on methods and interpretation of palpation to a point where they observe essentially the same tissue texture findings in a given case, even though they examine the case independently and without knowledge of the history and physical examination.

2. Tissue texture abnormality occurs predominantly in the upper cervical, midthoracic, and lumbosacral areas of the vertebral column and pelvis and at the angles of the upper ribs.

3. In general, tissue texture abnormalities are associated with positional and weight-bearing disturbances of the vertebrae and pelvis. However, there are certain important exceptions which must be noted in that an exceptionally robust young adult may have a major disturbance in position without abnormality in the texture of the tissues; conversely, a patient may show a major disturbance in the texture of spinal tissues without a corresponding disturbance in the position of spinal joints.

4. The neurological elements which appear to be involved in areas of tissue texture abnormality are discussed.

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An Approach to the Analysis of Spinal Stress Through its Physiological Manifestations

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INTRODUCTION

This survey incorporates a new and objective approach to the study of autonomic imbalance at the segmental level and to its possible origin in structural abnormalities. Since many disease syndromes are a consequence of autonomic imbalance, the establishment of a causal relationship between structural deviation and altered sympathetic function may provide a key to the primary etiology of these diseases.

In this study we have used the sweat glands as physiological indicators of sympathetic activity.[1] A convenient method for the study of such activity is available in the measurement of electrical skin resistance (ESR), first introduced into osteopathic research by Korr.[2] The existence of ESR patterns which have been related to visceral or myofascial disturbances[3,4] and which may be induced or influenced by postural stresses is reviewed by Korr in this Symposium (page 407).

It is well to recognize at the outset that the ESR method does not reveal the origin of the sympathetic activity which it measures. Such causes can be determined in man only through correlation with other reliable segmental features. In the x-ray analysis, clinical data, and the highly standardized palpatory findings of this coordinated survey, basis for this correlation is provided. Such integrative effort offers a reliable guide to those factors which determine the location and severity of autonomic imbalance.

THE PROBLEM

Years of clinical experience have demonstrated that structural disturbances (osteopathic lesions) are factors capable of initiating or influencing the rate and course of the disease process. Such effects are presumed to be at least the partial result of abnormal function of the autonomic nervous system. Thus it seems probable that one component of the osteopathic lesion complex is a somatovisceral reflex whose manifestations are organized at the segmental level of the central nervous system. However, the specific somatic stimulus or stimuli which initiate the reflex is not known.

An approach to the problem of determining the somatic source of reflex activity in man is now possible because objective methods have been developed for the study of various phenomena associated with the lesion process.

POSSIBLE SOURCES OF REFLEX ACTIVITY

The recognition of the following possible sources of reflex activity which may initiate or sustain the manifestations of the lesion complex forms a working hypothesis for the correlation of the features measured in this survey: electrical skin resistance (ESR) and tissue texture abnormality (TTA).

A. *Segmental.*—

1. Nerve impulses originating in sensory endings (muscle spindles, tendon receptors, or pain endings) stimulated by stretched, contracted, or contractured muscle

2. Nerve impulses originating at periosteal attachments stimulated by stretched, contracted, or contractured muscle

3. Stimulation of receptors in the ligaments or synovial membrane of the joint

4. Chemical changes in spinal muscles, in nerves, or in the spinal cord itself as a result of localized ischemia, inflammation, disturbances in lymphatic circulation, et cetera

5. Direct mechanical irritation of nerves

6. Any of the above listed factors in combination.

B. *Suprasegmental.*—

1. Postural reflexes

2. Nonspecific impulses of cerebral origin whose action is not localized, but which may serve to reinforce the activity from other sources.

For the purpose of the present study only the factors 1 and 2 listed under A have been selected. The suprasegmental factors are not specific and serve only to influence segmental phenomena, while the majority of the other mechanisms are not available for experimental investigation without insult to the subject. The mechanisms chosen are characterized by their responsiveness to alterations in tension-length relationships (actively or passively induced) of the paravertebral myofascial tissues. These sources of reflex activity are investigable in man through radiological study of the positions and movements of the bony levers (vertebrae) to which these tissues are attached.

GENERAL APPROACH

Although study of stresses and strains of the soft tissues through mechanical analysis of spinal configurations revealed by x-ray has been possible for many years, it has not been possible to test objectively the premises on which any such analysis is based, nor any hypothesis which related skeletal configuration to segmental reflex phenomena.

With the development, in our laboratories, of objective methods and highly standardized clinical criteria for study of the physiopathological manifestations of postural disturbances (osteopathic lesions) a basis is now offered for the testing of premises and for the development of a reliable system of spinal stress analysis. It now becomes possible for the first time to test whether any presumed stress or tension-length alteration is, indeed, an effective stimulus for provoking the lesion reflex-complex.

These investigations, of which this paper is but a very preliminary report, are based on the following general scheme: The determination, in a large number of subjects, of the segmental distribution of the various reliably measured physiopathological manifestations of the lesion, and the degree of correlation between these entities on the one hand and the nature and segmental location of the hypothesized stresses on the other.

Such a study should eventually accomplish the following:

1. Make possible the identification of the source of reflex activity associated with postural disturbances (or at least narrow the field considerably)

2. Help determine the nature and segmental distribution of the physiological abnormalities associated with specific paravertebral stresses and, therefore,

3. Increase the value and precision of radiological postural (structural) analysis as a diagnostic aid and guide to therapy.

THE SEGMENTAL PHYSIOPATHOLOGICAL ENTITIES NOW SUBJECT TO SCIENTIFIC STUDY

Tissue Texture Abnormality (TTA).—This widely employed criterion for determining the presence, location, and severity of the osteopathic lesion has been given a high degree of standardization by Denslow and his associates (as reported in the first paper of this Symposium, page 399).

Motor Reflex Threshold (MTR).—The pioneer electromyographic studies of Denslow,[5] and the subsequent investigations by Denslow, Korr, and Krems[6] served to establish a relationship between the motor reflex threshold (anterior horn cell irritability) of a given segment and the texture of the tissues investing the spinous process of the segment. The severity of the lesion, as reflected in the degree of tissue texture abnormality, paralleled the degree of lowering of the motor reflex threshold.

Other criteria for the osteopathic lesion (tenderness, lowered pain thresholds, susceptibility to trauma) have also been correlated with low motor reflex thresholds. From such studies the osteopathic lesion has come to be considered as a segment of chronic facilitation[7] in which the anterior horn cells (through the mechanisms now being studied) are maintained at an abnormally high level of reflex irritability.

Although motor reflex thresholds and altered pain thresholds have not been determined in the present study, they are, because of this correlation, presumed to be present in or near those segments having altered tissue texture over the spinous process.

Sympathetic Activity.—This feature has been investigated through measurement of the electrical skin resistance, wherein increased functional activity of the sweat glands produced by sympathetic activity is indicated by lowered skin resistance. Variations in the ESR pattern have been produced in response to postural, spinal, or myofascial stresses[4,8] which suggests that the chronic segmental facilitation associated with the osteopathic lesion may extend to and include the lateral horn cells (sympathetic outflow) as well as the anterior horn cells of the same or related segments.

Other Sensory, Autonomic, and Neuromuscular Features.—Methods are available or under development for the measurement of other features. (See next paper in this Symposium, page 407.)

HOW USED IN THIS STUDY

For the purposes of this survey only tissue texture abnormality and electrical skin resistance have been determined. However, in view of their significance and correlations with other entities (for example, TTA with low motor reflex threshold) they are accepted as criteria for the presence of reflex activity in the radiological quest for the (afferent) source of stimulation.

QUALIFICATIONS

Due to the differences in innervation of the skin, muscles, tissues over the spinous process, et cetera, the

appearance of topographical or even segmental coincidence cannot be expected. Consider the latissimus dorsi, for instance, with a nerve supply from the sixth to the eighth cervical but a wide attachment throughout the low dorsal and lumbar region. Reflex activity from this source, therefore, could produce an extensive response, or one which is confined mainly to the cervical region. Any disparity in the segmental or topographical relationship, however, should be explainable in terms of central connections and peripheral distributions of the nerve supply. In addition, the existence of any consistent disparity may provide a significant clue concerning the location and nature of the stimulus.

TENSION-LENGTH ANALYSIS FROM X-RAY PLATES

The criteria for establishing a relation between the tension and length of a muscle are presented here, not because they have been well established (which they are not), but because they are the only ones tested thus far. Although they have been found inadequate, for reasons which are presented later, they do indicate the rationale and point the general direction of future investigations.

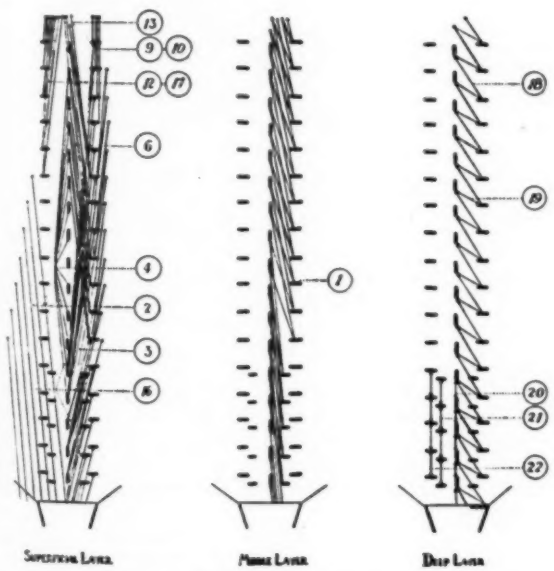

Fig. 1. Diagram showing the lines of pull of the fibers and the relative position and extent of the muscles which lie in the posterior vertebral grooves. The origin of the fibers is indicated by the tail, the insertion by the head of the arrows. The arrows extending outside of the groove represent fibers which insert on the ribs, but originate inside of the groove. The vertical rows of dashes represent the spinous processes of the vertebrae: the outer transverse rows, the transverse processes: and the inner transverse rows in the lumbar region, the mammillary and accessory processes. (After Braus, Piersol, and Spalteholtz).

Key to muscles:

1. Multifidus
2. Iliocostalis
3. Longissimus dorsi
4. Spinalis dorsi
6. Semispinalis dorsi
9. Longissimus cervicis
10. Longissimus capitis
12. Semispinalis capitis
13. Spinalis cervicis
16. Erector spinae
17. Semispinalis cervicis
18. Rotatores longi
19. Rotatores breves
20. Interspinales
21. Intertransversales mediales
22. Intertransversales laterales

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Abnormal Tension-Length Relations in Standing-Posture Films ("Static").—The muscles under consideration are the paravertebral muscles most intimately associated with spinal movement. These are the longissimus dorsi, semispinalis dorsi, multifidus, and the rotatores (Fig. 1). These muscles are found in bilateral symmetrical pairs and have the common property of being attached to levers of the vertebrae (spinous and transverse processes) in such a manner that increased tension of one side tends to produce a contrarotary movement between the vertebra of origin and insertion. As an example, consider the multifidus fibers attached to the spinous process at the seventh and ninth thoracic vertebrae and inserting into the articular process of the twelfth thoracic. If the fibers on the right are shorter and of greater tension (active contraction or contracture), then the presumed spinal configuration will be that of lateral flexion to the right in this area and rotation of the bodies of the seventh and ninth thoracic to the left in relation to the body of the twelfth thoracic. Conversely, if the right side is longer and of greater tension (due to activity of muscles other than the opposite multifidus) the appearance will be that of lateral flexion to the left with rotation of the bodies of the seventh and ninth thoracic to the left in relation to the body of the twelfth thoracic. Thus the rotational configuration is used as a guide to the muscle of increased tension while separation or approximation of the origin and insertion indicates passive and active tension respectively. Similar reasoning is applied to an analysis of the functions of the other short muscles. An exception is made in the case of the long fibers of the longissimus dorsi and semispinalis dorsi. Although their action may be basically similar, the angle of leverage is such that no reasonable presumption of rotational activity is possible. For the present, therefore, the long muscles are considered only as varying in length and no significance is attached to the rotational relationship between the vertebral bodies at their origin and insertion.

Procedure.—In recognition of the many possible causes for the appearance of asymmetries other than active or passive muscular tension, the actual procedure varies somewhat from the ideal approach described above.

1. Use of tissue texture abnormality: Because of the correlation of this finding with low motor reflex thresholds (involving the paravertebral muscles) the presence of TTA of a given spinous process is used to focus attention on a given spinal region.

2. Analysis of muscular involvement: The muscles whose origin, insertion, or span include the vertebra with TTA of the spinous process are then analyzed by the previously described procedure.

3. Presence of sympathetic hyperactivity (low electrical skin resistance): The segmental distribution of the nerve supply to the muscles exhibiting increased tension is then compared with the regions of low ESR. The presence of low resistance throughout the span of one or more of the muscles is then considered presumptive evidence of increased reflex activity produced by the abnormal tension state of the muscle in question.

Tension-Length Relationships in Motion or Stress ("Dynamic").—This procedure is an investigation of the mechanical soft tissue action under the influence of standardized motion or imposed stressful postures. From the abnormalities in the range or direction of individual vertebral adjustments and from the asymmetries (differences between adjustments to right and left motion or postural stress) it is possible to draw

inferences regarding the soft tissues which support and move the corresponding vertebrae as possible sources of reflex afferent bombardment. These inferences are then tested (as in the "static" procedure) by relating their segmental location to the presence of TTA and the appearance of low skin resistance.

The validity of this approach is indicated by ESR changes known to be induced by relatively minor postural stresses. (See Korr paper, page 407.)

Procedure (Tilt-Chair X-Rays).—In this procedure three anteroposterior x-rays are obtained in rapid succession. The first film is taken with the subject in normal level sitting position, the second film with the chair in a laterally elevated position (approximately 10 degrees) on the right side, and the third film with the left side elevated. The right and left tilt films are then compared with the normal level film and with each other. Any asymmetrical regions of lateral flexion or rotation are then correlated with TTA and ESR.

This method of analysis is at present confined to those spinal asymmetries which are relatively gross. However, current investigations are being made (stereoscopic on subjects and dissected spines) which should eventually yield a system of measuring minute differences in intervertebral relationships.

SOURCES OF ERROR IN TENSION-LENGTH ANALYSIS

Radiologic Interpretation.—Our present discussion will be confined to the standing-postural x-ray method used for most of the student survey being presented in this symposium. It has been through the effort involved in attempting a correlation between TTA, ESR, and the spinal configuration apparently revealed by the x-ray that a major source of error in radiological interpretation has come to be suspected. Because our method of analysis requires a relatively exact interpretation of the myofascial states required to produce a given picture of lateral flexion and/or rotation, it becomes necessary to determine the following conditions: When is the radiologic appearance of rotation and/or lateral flexion *not* the result of abnormal myofascial states?

Appearance of Rotation Without the Direct Contribution of Myofascial Abnormality.—In the standing posture, the position of any portion of the bony framework is directly dependent upon the position of the structures below the point in question. Thus, if the feet are rotated with respect to a fixed line (plane of the x-ray film), the entire trunk will appear rotated in the film. The appearance of a normal (nonrotated) trunk, under these conditions, will be presented only when some myofascial compensation has been made to correct the rotary displacement of the rest of the body. Similarly, if the pelvis is rotated about the midline, the rest of the trunk above the pelvis will appear rotated. The same reasoning can be applied to any intervertebral junction of the spine beginning with the sacrum. Therefore, we conclude that any rotational displacement at a given point will result in the appearance of rotation above that point. The appearance of a normal spine (no rotation) will be noted only when some factor is involved which compensates for the rotary displacement present below.

Appearance of Lateral Flexion Without the Direct Contribution of Myofascial Abnormality.—Here again, as in the discussion above, the influence of rotation on the appearance of the spine must be considered. If the spine were perfectly straight in all dimensions, then rotary movements would only result in the appearance of rotation. However, the spine has two anteroposterior curves (excluding the cervical spine), anteriorly convex in the lumbar region and anteriorly concave in the dorsal region. When the two-dimensional appearance of the spine on the x-ray film is interpreted in the light of its actual three-dimensional existence, then it is noted that rotation will unavoidably result in an oblique presentation of the anteroposterior curve. This will show the anteroposterior curve and with increasing obliquity (until a true lateral view is reached) the curve will become more and more pronounced. Thus it can be seen that rotation at a given point will result in the appearance of lateral flexion (the direction depending on the region, dorsal or lumbar) in all the structures above. They will appear to have no rotation or lateral flexion only when there are factors which have compensated for the rotation.

The method of dynamic spinal analysis is in such an embryonic stage that the sources of error have yet to be recognized and, therefore, no presentation of the possible errors can be made at this time.

Methods of Resolving the Sources of Error in "Static" Postural X-Ray Interpretation.—The basic problem is that of learning to recognize, in the x-ray, the spinal appearance which represents the normal, nonstressful (passive) configuration relative to the position of the structures below. This is being investigated by the use of stereoscopic x-ray studies on models (dissected spines) and living subjects.

SUMMARY

1. Preliminary investigations have demonstrated a correlation between the osteopathic lesion process and certain well-defined objective phenomena (sympathetic hyperactivity, low motor reflex threshold, and tissue textural abnormality of the spinous process).

2. Experimental studies have demonstrated that minor postural stresses (heel lift, tilt-chair) induce segmental hyperactivity of the sympathetic nervous system.

3. A working hypothesis for the recognition (in standing-postural x-rays) of altered tension-length relationship of paravertebral muscles has been presented. This has been examined by correlation with tissue texture abnormality and sympathetic hyperactivity.

4. The attempt to correlate the radiologic appearance of spinal configuration with the presence of tissue texture abnormality and sympathetic hyperactivity has revealed certain inadequacies in the interpretation of myofascial stresses based on standing-postural x-rays.

5. The basic source of error in interpreting standing-postural x-rays is the lack of information regarding the normal (nonstressful) appearance of a given segment or region in the presence of rotary displacement below that point. This information is being sought by the use of stereoscopic studies (radiologic) on models and living subjects.

6. A radiologic method being developed ("dynamic" analysis) for investigating the influence of the soft tissues during adjustments to bilateral, symmetrical stresses is presented.

7. Through the use of objective methods as a check on any hypothesis relating structural disturbance to functional stress such studies should eventually reveal the somatic source of reflex activity contributing to the maintenance of the chronic segmental facilitated state.

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The Three Fundamental Problems in Osteopathic Research

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The preceding papers on this Symposium have been progress reports on four different but related classes of information collected at a certain stage in the life of a certain group of individuals. We believe the survey is unique in osteopathic history for a number of reasons inherent in its approach to osteopathic fundamentals—and therefore to the whole question of health and disease. First, it is an ensemble of three conventional, reliable guides to osteopathic diagnosis and therapy which have been brought to a high level of standardization, in combination with a completely objective method for the evaluation of lesion phenomena. This objective method is but one of many in process of development in the Department of Physiology for this purpose.

Second, the survey is unique in that it is a study on early stages of pathological processes in a predominantly healthy population. These are pathological processes which receive no consideration in allopathic practice. In the early stages in which they are found in this group of young men and women, they are for the most part asymptomatic. With only few exceptions would they have provided the basis for a visit to a physician's office. Since this is a continuing survey which provides for observation of these pathological processes and their response to therapy over a long period, it provides a new and much needed approach, we believe, to truly preventive medicine.

The immediate value of this survey lies in the fact that it has made it possible to arrive at a clearer and more unified formulation of the fundamental osteopathic problems than has ever been attainable before. It has also illuminated the paths that must be taken toward their solution. It is the purpose of this paper to discuss these problems and their approaches.

It is well established that the postural, structural, or mechanical abnormality known as the osteopathic lesion, sets in motion a complex physiopathological process, whose course, speed, and ultimate manifestation are influenced by all the factors in human life which cause one individual to differ from another.

The ultimate objective of the research team, such as the one represented in this Symposium, is continually to arm the physician with better and better methods of detecting, evaluating, preventing, and favorably influencing the disease process associated with the osteopathic lesion. This can be accomplished only through explorations into its intrinsic nature.

With this in mind, our survey shows that the fundamental problems before osteopathic research workers today are essentially three in number. We call them "fundamental" because each is central to—lies at the basis of—thousands of others which the osteopathic profession encounters in daily practice. The solution of the central one provides the basis for the solution of the numerous peripheral ones related to it. Progress in science is measured by the recognition of the central problems—and the resolution of the many into the few. Discussion of the three fundamental problems follows:

1. THE LESION PROCESS

We have designated the first problem as the lesion process itself. The development and varied manifestations of the osteopathic lesion are organized by a complex process set in motion by certain stresses. In this Symposium we are concerned primarily with those imposed on the body by gravity or influenced by gravity. It now appears well established that this process is reflex in nature and that the flow of impulses along the complex pathways is initiated by stimulation of some sensory path or paths which are yet to be identified. Once initiated, this cycle of impulses somehow sustains itself and proceeds to organize the various but related manifestations of the lesion complex.[1]

The process may be initiated, apparently, by gravity which, acting through the levers of the skeletal system, imposes stresses on the tissues which support and move these levers. In abnormal body mechanics, these stresses excessively excite and continue to excite those receptors and nerve endings which are responsive to tension, pressure, alteration in length, and to differentials in these.[2,3] Their responses are registered upon the central nervous system through afferent fibers entering the corresponding segments. By definition these comprise the proprioceptive system of the body. Their exact mode of action under abnormal weight-bearing stresses remain to be elaborated. Thomas, in the preceding paper in this Symposium, has presented a promising approach to the functional analysis of proprioception in different—naturally occurring—skeletal configurations associated with faulty weight bearing. Still other sources of primary irritations are yet to be identified.

What *is* the process which, when initiated by weight bearing or other stresses, organizes the manifestations of the lesion complex? What are the bonds between the various components of the lesion complex? What is the pattern into which they fit? Progress in this field requires first the clear identification of the

components of the lesion complex. The manifestations of the osteopathic lesion, regardless of its nature, location, or origin, appear to fall into three main categories.

They are (1) the sensory and suprasegmental; (2) the motor or neuromuscular, and (3) the autonomic or vegetative.

1. Let us consider the suprasegmental component first. It is easier to reach the conscious and other higher levels of the nervous system through the lesioned segment than through the nonlesioned. Commonly this is expressed in hyperesthesia and hyperalgesia (and spontaneous pain if present), but it extends also to other more subtle influences on higher-level functions not yet evaluated.

2. The second category of manifestations is the motor or neuromuscular. This category includes local alterations in tensions and contractile states. These are manifested to the physician as palpable rigidity and limitations or resistance to motion, to the patient as pain or fatigue.

3. The third category is the autonomic or vegetative. When we reflect on the many different kinds of tissues and organs under autonomic control and their many different activities, we see that autonomic influence is extremely varied in its expression. Actually, however, there are only two possible categories of expression of autonomic influence: alterations in smooth muscle activity and alterations in secretory activity. The first, of course, includes vasomotor activity as well as visceral.

In these three categories—suprasegmental, motor, and autonomic—are encompassed, we believe, *all* observed and possible manifestations of the osteopathic lesion. The details of these manifestations, and there is an infinite multitude of patterns, are determined primarily by the locus and secondarily by other factors to be discussed.

For example, depending upon the segments involved, sympathetic hyperactivity exerted upon the bronchioles will have quite a different manifestation and effect on the body from that resulting from similar hyperactivity exerted, through other segments, upon the colon or the eye, the stomach or the heart, the kidney or the pancreas, the adrenal cortex or the thyroid, although the same fundamental process is common to all. Further, intense sympathetic hyperactivity may produce ischemia in different tissues, including the central nervous system itself, but the effects on the body will show many variations in accordance with segmental level. Thus, we see the limitless range of manifestations that may result from the same fundamental process according to its site of action.

It is important to recognize that these three general categories in which the osteopathic lesion expresses itself—again, the suprasegmental, the motor and the autonomic—are not unique to the osteopathic lesion. The same general manifestations and the same fundamental process lying at their basis are associated with a great many other pathological processes: those of primary visceral origin, those of traumatic origin, those of microbial origin, and those having a large psychogenic element.[1] In essence, this means that the same central process may be initiated in different ways; the postural stress is only one of many. The pattern is determined by the locus and not by the initiator. This is partially recognized in the designation, "secondary reflex lesions."

We begin to recognize, therefore, that a great many diseases which on the surface are so diverse in character as to require a highly complex system of differential diagnosis, therapy, and nomenclature are essentially one disease, the manifestations of an identical process expressed in different parts of the body. When we have learned the intrinsic nature of the process, we shall know how to prevent or interrupt it wherever it may be, whatever its mode of initiation, and thereby deal in a unified system with many diverse diseases, rather than with each one in a different way. Today, the science of osteopathy offers the only approach to a unitary concept of health and disease, because it alone recognizes the universality of this process and its signs. Since only osteopathy knows how to recognize and deal with the early stages of this process, it provides the only basis today for the preventive medicine of tomorrow.

The process lying at the basis of these three general categories of clinical manifestations remains to be identified, and this, perhaps, is one of the most important problems before society today since it may very well be the key to many of the chronic degenerative disorders—the main causes of ill-health, premature senility, and death.

What clues are there? We have come to recognize in the past few years that the lesion complex, that is, the three categories of manifestations, is organized by the central nervous system.[1,2] The pattern of expression, potential or actual, is determined by the parts of the nervous system involved. Other factors can only influence the fullness of its expression at any given time. Recent research in our laboratories indicates that osteopathic lesions are associated with segments of the spinal cord from which impulses flow more easily along ascending neurons to the sensory and other higher centers, along its anterior horn cells to skeletal muscles, and along the autonomic outflow to smooth muscle and glands of many different kinds. These three kinds of neurons, corresponding to the three general manifestations, are, in the lesioned segment, always closer to activity or are continually more active than corresponding neurons in other segments. It takes less of a stimulus, from any source, to send them into activity and to sustain activity. For this reason, we have come to think of the segment in lesion as a facilitated segment.[2,5] It is a neurological lens which focuses and exaggerates irritations upon those tissues which it supplies. In short, lesioned segments are those which are, in the true physiological sense, in a continual state of "alarm" or are continually bordering on a state of alarm. Over a period of time damage, to some extent, is inevitable.

2. THE TIME FACTOR

This brings us to the second fundamental problem—the time factor. Here we are concerned with the changes that take place as the process ages. We know very well from clinical experience that the lesion complex and its many manifestations do not spring full blown into being; there may be many years between the initiation of the lesion process and the full or even partial expression of the latent pattern.[6]

The structural survey* being conducted on several hundred school children by Wallace M. Pearson and George Rea and their coworkers at the Kirksville College of Osteopathy and Surgery indicates that

*This survey is made possible by the program of regular physical examinations of Adair County rural school children at the College Clinic. This program is directed by Vernon H. Casner, D.O., head of the Department of Public Health and County Health Officer.

serious weight-bearing and other skeletal abnormalities already have a high frequency in children between the ages of 6 and 12. However, the physical findings and the obvious well-being and vigor of most of these children—in the face of apparently serious postural stresses—indicate that the lesion process has not yet produced striking physiopathological changes. We can reliably predict, however, on the basis of the survey which is the subject of this Symposium, that these same processes will have taken some toll by the time these children have reached the average age of the student body at Kirksville College, even though serious symptoms may still not have attained high incidence. Even casual observation supports the additional prediction that aches and pains, as well as chronic disease, will have become a daily feature in the lives of many of these children by the time they have reached the average age of the Kirksville faculty. The seed for these disabilities is already planted in those postural stresses of which these youngsters are, for the most part, so blissfully unaware today. The stages through which the lesion process passes over a period of years has hardly been explored.

We know that the primary process induces pathological changes in various tissues including viscera and the nervous system itself, as discussed under the first problem, and that these in turn become secondary sources of irritation. These secondary sources not only contribute to the maintenance and exacerbation of the pathology, but over a period of time they may actually shift the balance of pathological forces to new and even opposite directions. The same may be said of the various adaptive or compensatory reactions and tissue changes elicited by the primary lesion. An excitatory effect may resolve itself into an inhibitory effect and vice versa. Certainly, the acute lesion is quite distinct in many aspects from the chronic one.

A great deal remains to be learned regarding these various secondary and tertiary changes and *their* consequences. The terms we use to designate or describe them, satisfying though they may be to the user, are only names or descriptions that cleverly conceal a lack of knowledge. The words "trophicity" and "trophic change," for example, represent a rich and unexplored world.

It is important to remind ourselves in this connection that in the subjects of this survey, the secondary and tertiary changes are not yet fully developed and, to that extent, the pathological processes which we are studying are, as yet, chiefly preclinical or subclinical and presumably still reversible. The importance of this concept to the prevention of disease is clear.

3. OTHER FACTORS

Now we come to the third fundamental problem: Other factors which decisively influence the lesion process. We have come to recognize that the osteopathic lesion as a phenomenon of central facilitation is a most important predisposing, localizing, and probability-increasing factor in disease. It is very often the decisive factor. As the most accessible factor in the disease complex, the osteopathic profession has clearly demonstrated that the treatment of the lesion may make the difference between relatively good health and relatively poor health.

As our survey has made quite clear, the degree of fullness of expression of the pattern behind the lesion complex is greatly influenced by a large variety of factors. These obviously include all the factors that distinguish one individual from another: the constitutional factors (another generic term behind which we vainly try to conceal ignorance), age, environment, past history, nutrition, emotions, personality, and many others. A given structural defect may produce no clinical manifestations in one individual and a serious one in another. A relatively quiescent lesion may suddenly, under a new set of circumstances, or gradually, as through the process of growing older, bring into manifestation the full latent pattern of processes and manifestations inherent in that part of the central nervous system. At our present stage of knowledge, we can have only a notion regarding the general *direction* of the influence of these factors, but little more.

The influence of cerebral factors, for example, on the speed of the fundamental process and the fullness of its expression, is implicitly recognized in the practice of psychosomatics. For want of a more direct approach to the process, psychotherapy is, of course, eminently useful in the treatment of disease. The emergence of psychosomatics in recent years bespeaks the triumphant recognition, in allopathic practice, that here, at last, is an etiological approach to chronic disease. The osteopathic lesion, however, has for three quarters of a century been known to provide a more specific somatic handle for the manipulation, literally, of the process itself.

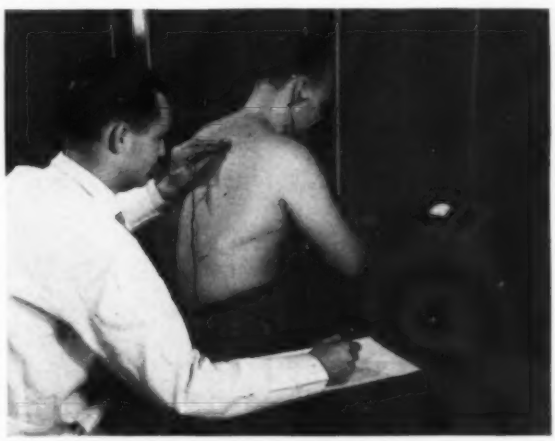
These, then, are the fundamental problems before osteopathic scientists today: (1) The primary process initiated by postural stress which organizes the pattern of the lesion complex, (2) the changes and accruals with time, and (3) the other factors which influence the rate and fullness of expression of the pattern. There are, of course, many other problems. Careful reflection, however, shows that most of those that come to mind are peripheral and will fall into line as information accumulates on the central ones.

METHODS OF THE DEPARTMENT OF PHYSIOLOGY

In the space that remains I wish to review a few of the methods that are being adapted and developed in the Department of Physiology for the investigation of the problems discussed above and for incorporation into this continuing survey.

It must be emphasized that these procedures have been developed for investigative purposes only and are by no means to be considered ready for inclusion in the diagnostic armamentarium. Although it is probable that at least some of these procedures will even-

Fig. 1. Measurement of electrical skin resistance. (See text.)



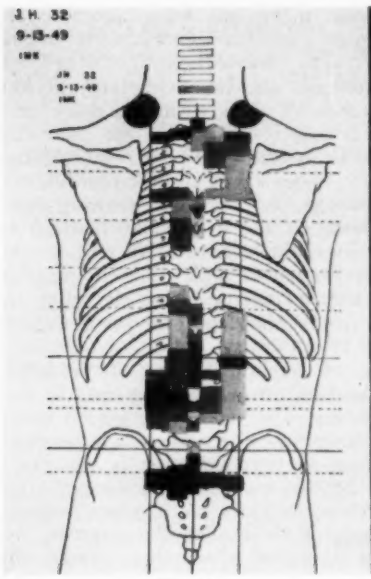


Fig. 2a

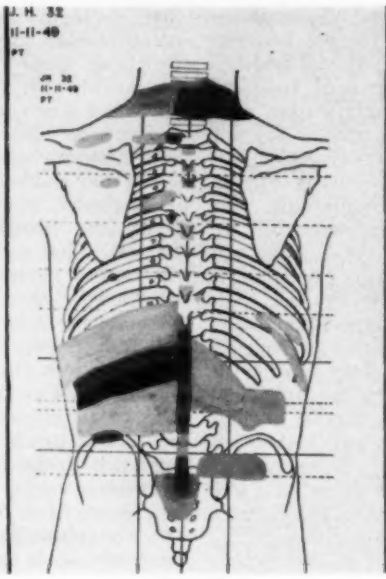


Fig. 2b

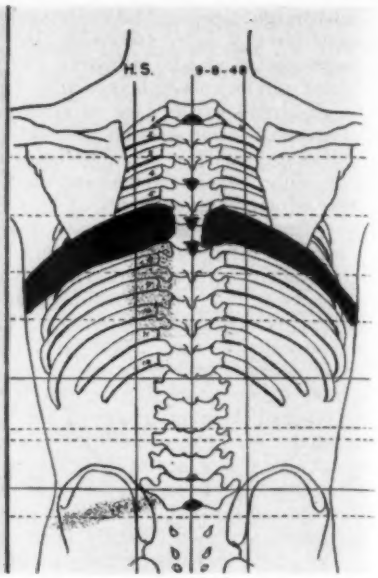


Fig. 3

Fig. 2. Illustration of constancy of segmental distribution of low resistance areas (shaded). Explorations 2 months apart on same subject, by different methods and different examiners are recorded in 2a and 2b. This case was selected to show extreme variations in size, shape, and intensity of low resistance areas while segments involved remained essentially unchanged. (Other explanations in text.) Fig. 3. Bilateral dermatomal strips of low skin resistance found in case of acute gastritis.

tually be of clinical value, since they do evaluate segmental features associated with clinical disturbances, a great deal more information remains to be accumulated and analyzed before it can be known what clinical significance to assign to these measurements.

Denslow and his coworkers[5,7,8] have shown that the spinal lesion has associated with it a low motor reflex threshold, that is, it takes less of a stimulus to induce reflex muscular activity in the lesioned than in the nonlesioned segment. This means that in the lesioned segments, the anterior horn cells, at least of the paravertebral muscles, are in a state of hyperirritability. The segment is said to be facilitated with respect to motor activity. We are now correlating measurements of other segmental features with motor reflex threshold.

It was of interest to determine whether the facilitation extended to other neurons in the lesioned segments. We turned to the sympathetic outflow and, as Thomas stated in the preceding paper of this Symposium, have used the electrical skin resistance method for this purpose.[9,10,11] In this method, the sweat glands are the physiological indicators of the relative activity of the lateral horn cells in the various segments.

Figure 1 shows a skin resistance exploration in progress. Known voltages are applied through the skin in such a way that the current which flows, measured in millionths of an ampere, indicates the resistance of the skin underlying the exploring electrode at a given time. By adjusting the voltage so that little or no current flows through most of the skin, areas of low resistance are sharply differentiated by excursions of the microammeter needle. These findings are then recorded on body charts. The low resistance areas represent sympathetic hyperactivity.

Repeated explorations over long periods on many subjects have shown that low resistance areas are present in all subjects; that the distribution of low

Figs. 4a and 4b. Effects of intramuscular injection of hypertonic saline. Injections of 0.3 cc. of 6 per cent sodium chloride into sites marked by X (left erector spinae mass at eighth thoracic segment and right intercostal, ninth thoracic) cause appearance of new low resistance areas in corresponding dermatomes. (New areas encircled to distinguish from pre-existing areas.) Figs. 5a and 5b. Distribution of the new areas several hours after experiment of Figs. 4a and 4b.

Fig. 4a

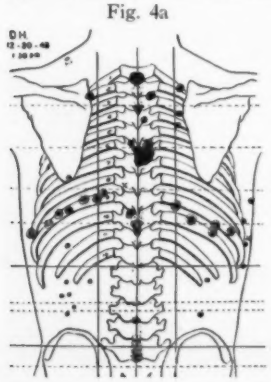


Fig. 4b

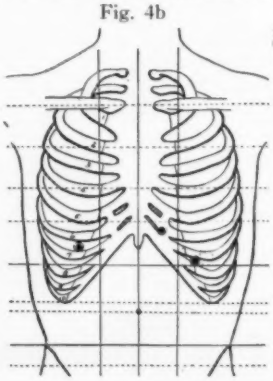


Fig. 5a

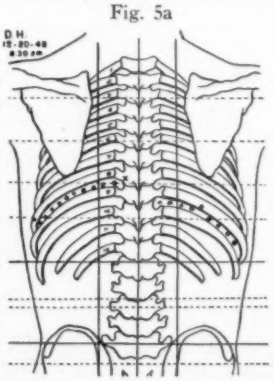
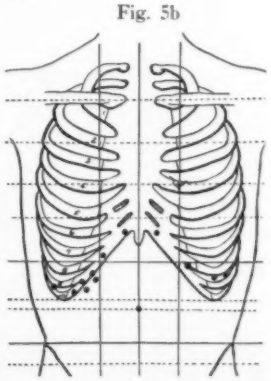


Fig. 5b



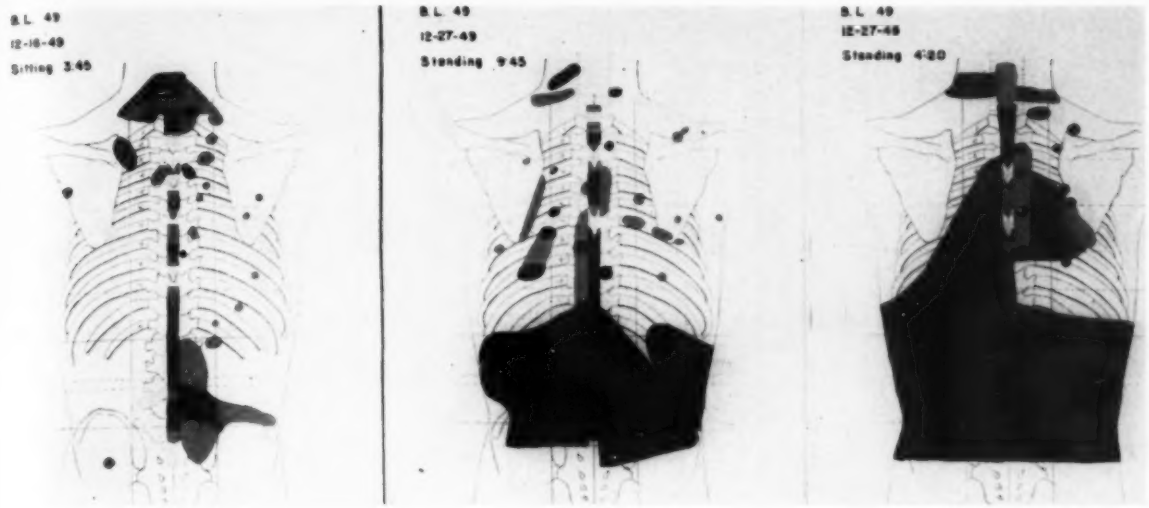


Fig. 6a Fig. 6b Fig. 6c

Fig. 6. Changes in skin resistance pattern with posture and activity. (See text.) (a) Afternoon, seated; (b) morning, standing; (c) late afternoon, standing.

resistance areas, that is, of sympathetic hyperactivity, varies from individual to individual, but that in a given individual, the segmental distribution may remain constant for many months. In these segments, therefore, the sympathetic outflow appears to remain in a state of activity while elsewhere it is at rest. This hyperactivity, or state of alarm, presumably extends not only to the sweat glands, but to structures innervated by the sympathetics—blood vessels and viscera.

Figure 2 compares two explorations done independently by two examiners 2 months apart on the same subject and illustrates the stability of the patterns. Note that although the size, shape and intensity of the areas are variable, since they may change with posture, previous activity, temperature, et cetera, the low resistance areas remain concentrated in the same segments.

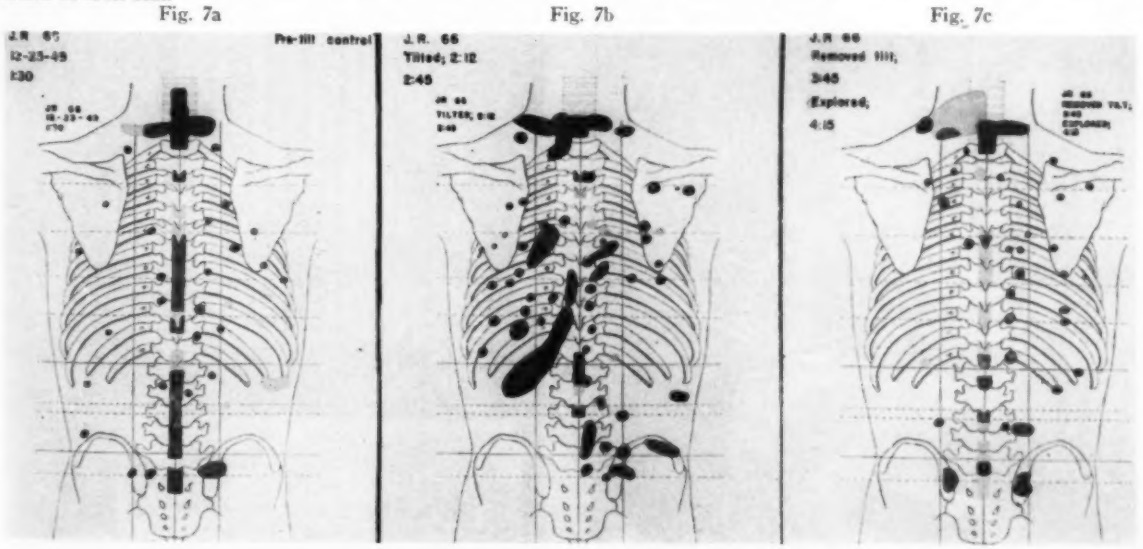
The segmental nature of these patterns is further reflected in the frequently observed dermatomal strips of low resistance, often extending from spine to sternum. Figure 3 illustrates an extreme case of dermatomal involvement in a young man during an attack of acute gastritis. Over several preceding months he had consistently showed sympathetic hyperactivity in the sixth to ninth thoracic segments.

Fairly specific and constant patterns have been shown to be associated with certain visceral syndromes, the low resistance areas occurring in those segments from which the involved viscus derives its innervation.[10] In several cases we have observed the appearance of these patterns long in advance of the first symptoms. Since our primary concern in this symposium is with myofascial and postural stress, the patterns associated with visceral disease will not be reviewed in this paper.

Time does not permit review of the various patterns we have found associated with acute lesion pathology, severe back disorders, trauma, and the effects of treatment.[11] The next five figures illustrate

Fig. 7. Effects of tilting sacral base plane, "acute scoliosis." (See text.) (a) Level seat, (b) right side elevated 1 hour, (c) return of level seat.

Fig. 7a Fig. 7b Fig. 7c



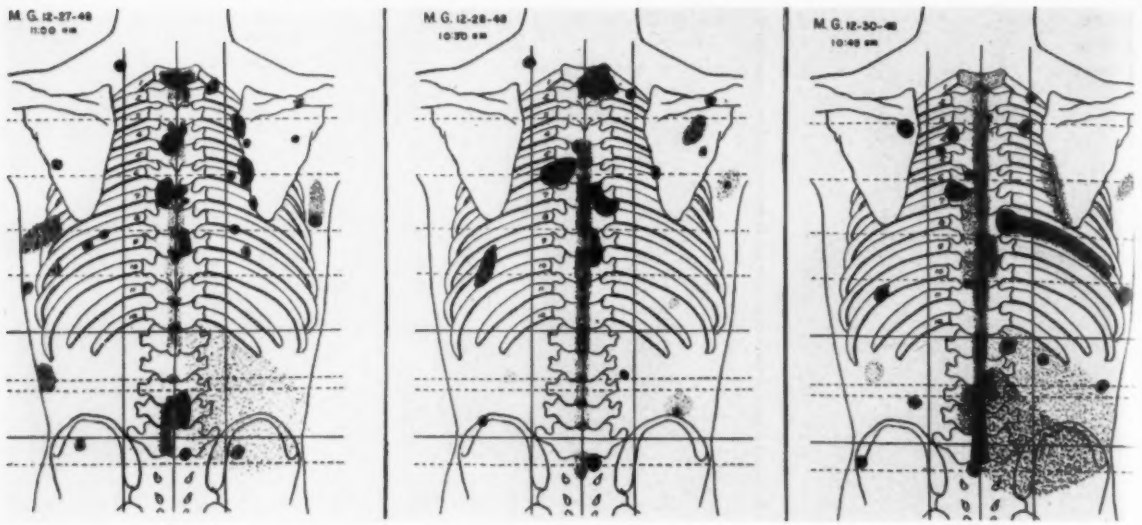


Fig. 8a Fig. 8b Fig. 8c

Fig. 8. Heel-lift experiment. (See text.) (a) Control, (b) 24 hours after lift inserted in right shoe, (c) 24 hours' after removal of lift.

the effects on skin resistance patterns of experimentally induced myofascial irritations and postural stresses.

Figure 4 shows the effect of injecting 0.3 cc. of 6 per cent sodium chloride solution into skeletal muscle. The ringed areas on the left appeared within a few minutes following the injection of the hypertonic salt solution one inch deep into the spinae erector mass at the eighth thoracic segment (site marked by X). The areas (ringed) on the right followed injection into the intercostal at the ninth interspace (X). Note the involvement of entire dermatomes. Several hours later the newly induced area appeared as shown in Figure 5. In the course of exploration, these dermatomes became vivid hyperemic strips due to the repeated passage of current although all other areas, explored at the same voltage, remained unchanged in appearance.

Figure 6 shows a series of explorations of a

Fig. 9. Device for semiautomatic photographic recording of skin resistance patterns. The recording camera is mounted above the subject. Fig. 10. Record made by device shown in Fig. 9. Dark areas, as in "hand explorations," represent areas of lowered resistance. Record is photographically superimposed on subject's body. Numbered white dots indicate tips of spinous processes. Note calibration strip on left, from which actual resistance of any area can be accurately determined.

Fig. 9

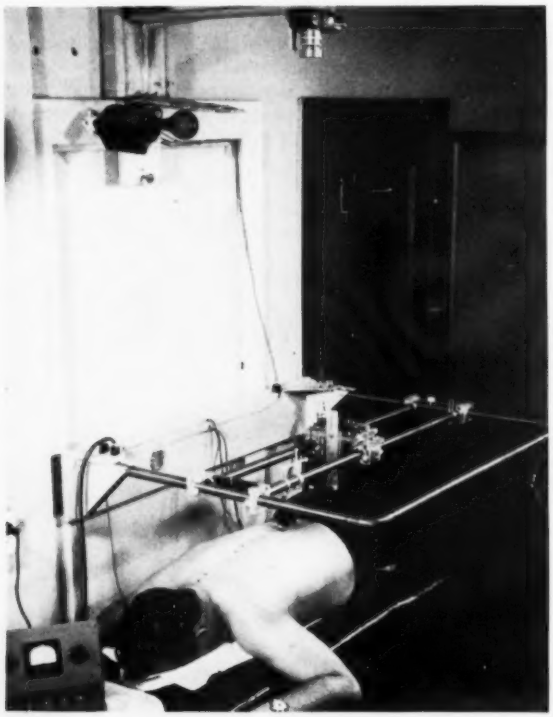
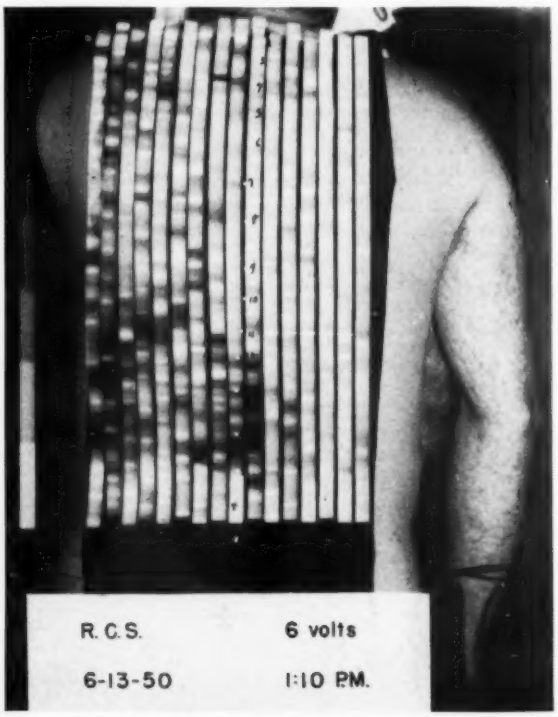


Fig. 10



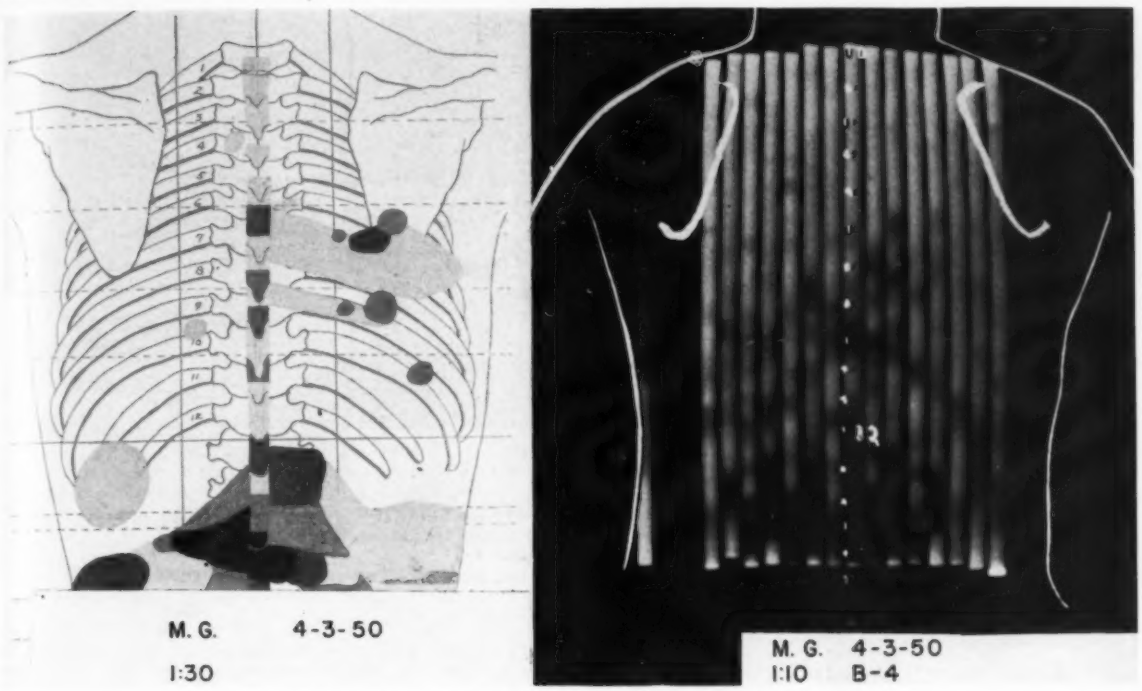


Fig. 11. Comparison of "hand" and "automatic" explorations. (See text.)

subject who is the victim of frequent backaches in the lumbar region. The first chart (6a) shows his pattern in the afternoon while seated. The middle chart (6b) shows his pattern in the morning while in the standing position. The third chart (6c), an exploration done in the standing position late in the afternoon of the same day after a full day's work, shows the greatly exaggerated effect of continued activity and fatigue on the sympathetic nervous system in the facilitated segments.

Figure 7 illustrates some of the effects of postural stress. In the first exploration, the control (7a), the subject was seated on a treating stool with his elbows resting on the desk before him. Following the completion of this exploration, the right end of the stool was raised 1½ inches, while he otherwise maintained his position. The middle exploration (7b) was made at the end of an hour. The new areas thus induced are quite conspicuous, especially the one in the lower thoracic region, on the left side, located on the convex side of the induced spinal curve. The third chart (7c) shows the effect of return to a level seat.

Figure 8 illustrates one of the experiments in which postural stresses are induced or modified by means of heel lifts. The first chart (8a) shows the pattern which had been characteristic of this subject over a period of several months. His right femur head was approximately ¼ inch lower than his left. He was occasionally troubled with pain in the lower lumbar area, on the right side, corresponding to the low resistance area in that region, especially after exertion. This exploration was done in the morning following a 1½ mile walk. A ½ inch heel lift was inserted in the right shoe immediately after this exploration. The subject wore the lift throughout the day and the following morning while engaged in his usual activities and during the 1½ mile walk to the laboratory. The second chart (8b) shows the exploration of that morning. The extensive low resistance in the lower right side has been eliminated, but there is a flare-up and expansion of the areas in the thoracic segments, indicating, we believe, severe insults to these segments. The lift was removed after this exploration. The third chart (8c) shows the skin resistance pattern on this subject the following morning, again after a 1½ mile walk. The area over the ileum returned, and there was further increase in sympathetic hyperactivity in the thoracic segments, presumably induced by a second acute postural adjustment.

The skin resistance explorations by means of the hand-held electrode are slow and tedious, requiring from 30 to 90 minutes for each exploration. They, therefore, make impossible the study of rapid changes. They require a considerable amount of training on the part of the observer and patience on the part of the subject. Figure 9 shows an instrument designed in our laboratory and constructed in the laboratory machine shop,[12] which photographically records the electrical skin resistance patterns almost automatically, in about 10 minutes. It can be operated in the vertical position, for the study of acute postural stress, as well as in the horizontal. Space does not permit a description of the instrument, except to say that the trunk is explored automatically in longitudinal strips, and that a light mounted over the exploring electrode is caused, by a simple amplifier, to vary in brightness in accordance with the resistance of the skin over which it passes. A camera mounted above records these strips of light of varying intensity, as though they were coming from the corresponding strip of skin itself. By means of a controlled double-exposure, the record is accurately superimposed on a photograph of the subject's body, with the bony prominences marked (Fig. 10).

Fig. 12. Colorimetric visualization of regional differences in sweat gland activity. The method utilizes the color change of cobalt chloride from blue to red when moistened. In our preparation the cobalt salt is mixed with hygroscopic calcium salts to increase the contrast. Photographed through an appropriate red filter, blue areas (dry) appear dark; red (moist) appear faded. The photographs, taken at short intervals (note time on each picture), show the regional differences in the rate of thermoregulatory sweating response in this subject. The experiment may be repeated by permitting the subject to cool, whereupon the blue color returns. Mild thermoregulatory response is induced by applying heat to extremities or ventral surface.

Figure 11 shows a comparison of one of our earliest automatic explorations with a hand exploration done immediately afterward. Note the high degree of correspondence between the two; the midthoracic dermatomal strip on the right side is especially clear

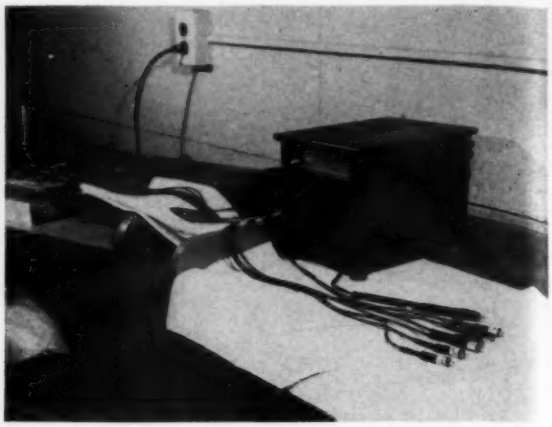


Fig. 13. Part of equipment for measurement of cutaneous and deep muscle temperatures with galvanometer and thermocouples incorporated in fine hypodermic needles. Skin thermocouple and constant temperature bath for "reference" thermocouples are not shown.

in the photographic record. It is of interest to point out that the subject used for these explorations was the one used in making Figure 8. However, the explorations recorded in Figure 11 were done 10 months later by another experimenter. The charts in Figure 8, especially the third (8c) are almost superimposable on the later ones, again stressing the stability and chronicity of the segmental patterns of sympathetic hyperactivity.

The photographic dermometer has already made possible a considerable expansion of our program. It will make possible a rapid evaluation of the diagnostic or prognostic value of skin resistance, through the correlation of patterns with many kinds of clinical entities in large numbers of patients.

Figure 12 shows one procedure under development in our laboratories for the visualization of regional or segmental differences in sweat gland activity, by colorimetric means. Other visual and photographic technics, involving fluorescence or regional color differences under ultraviolet and infra-red light, related to differences in blood supply and tissue fluids, are also under investigation.

Fig. 14. The measurement of muscle hardness and resiliency, by contact time and rebound of dropped weight. Fig 15. Measurement of segmental pain thresholds (cutaneous). Adaption of Hardy-Wolff-Goodell thermal stimulus method.

Fig. 14 Fig. 15

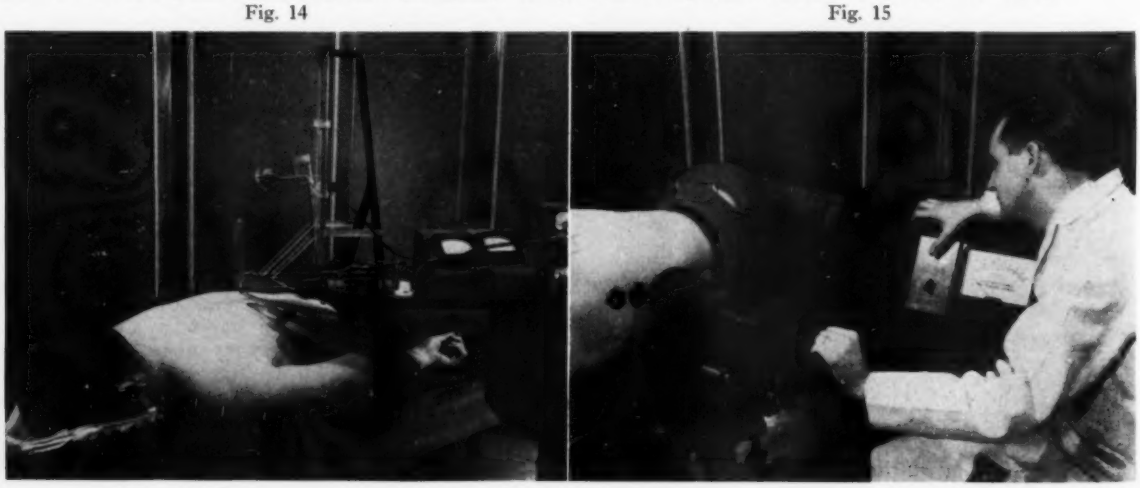


Fig. 16a

Fig. 16b

Fig. 16. Renal clearance experiment. (See text.) Trained dog, unanesthetized, has received large volumes of water through stomach tube to establish diuresis; intravenous infusion was administered through vein in paw. (a) Urine specimen being taken through catheter. (b) Blood specimen being taken from external jugular vein. The dog is "Ma", happy veteran of 3 years of experimental work and respected matron of the kennels.

Figure 13 shows some of the equipment utilized in the measurement of cutaneous and deep muscle temperature as a guide to vasomotor activity or inflammation at various depths, in relation to lesion pathology. Thermocouples have been constructed in No. 26 gauge hypodermic needles which can be inserted into muscle, tendon, or ligament at various depths and at different segments. Another type of thermocouple, not shown, is used for the recording of skin temperatures. A high degree of stability of the patterns of segmental distribution of relatively warm and relatively cool skin has been demonstrated in each of a large number of subjects, while the patterns vary from subject to subject. Large differences in intramuscular temperature have also been found between neighboring segments. The significance of these differences is expected to emerge from correlation with other segmental features.

In Figure 14 is shown another device being developed in our laboratories, for the precise and objective measurement of muscle hardness and resiliency, with which we hope to be able to quantitate abnormalities in tissue texture associated with postural and other disturbances. In addition, Shirley A. Johnson, Ph.D., also of the Department of Physiology, is conducting a study on the chemical and metabolic changes in contractured muscle, so frequently associated with lesion pathology.

Figure 15 shows one approach we are taking to the sensory or suprasegmental components of the lesion complex. This method permits the precise measurement of cutaneous pain thresholds at various segments for correlation with other segmental measurements. Another procedure is being designed for the measurement of hyperalgesia in deeper tissues.

The methods which have been briefly reviewed here, and others in process of development, are characterized by a high degree of precision and objectivity in that they are relatively independent of the subjective senses and judgment of the observer; they are therefore more easily subject to confirmation. They are characterized, also, by the fact that they are applicable to the study of the osteopathic lesion complex in its natural habitat, so to speak—as it occurs in the human body. Through analyses of the patterns in which these various segmental features, and others to be added, appear we shall acquire a deeper insight into the processes which organize those patterns. It can be said that, through these procedures, a true physiological mosaic of the osteopathic lesion has begun to be laid.

More direct approaches require, of course, the use of experimental animals. In one investigation, conducted by Dr. Johnson and the writer, we are attempting to evaluate the effect of myofascial irritations applied to various segments of the back on renal function, especially renal hemodynamics. We selected the kidney because methods are now available for the precise measurement of the amount of blood flowing through the kidney per minute, the rate of glomerular filtration and tubular activity in the intact unanesthetized animal or human, and the acute and chronic effects thereon of various experimental lesions. Its potential importance to cardiovascular-renal disease is clear.

Figure 16 shows an experiment in progress on one of our six dogs which have been trained to lie still and at ease for several hours while they receive water through stomach tubes (to induce diuresis) and intravenous infusions and while numerous blood and urine specimens are taken at precise intervals.

Other visceral studies, utilizing roentgenologic and other technics, are in prospect. In another series of experiments to be begun in the near future, we shall undertake a direct analysis, by electrophysiological methods, of the exchange of excitation between the somatic and autonomic nervous systems.

CONCLUSION

In conclusion, we wish to affirm our belief that from such studies and from the continuation and expansion of such surveys as reported in this Symposium, there will emerge new and unforeseen

approaches to urgent and universal health problems whose solutions are inherent in the osteopathic concept.

Acknowledgments

It is a pleasure at this time to acknowledge, with great appreciation, the support of this work by the American Osteopathic Association and by the National Institutes of Health, United States Public Health Service. It is also a great pleasure to acknowledge the important contributions to this program of the student research assistants appointed under A.O.A. grants. Through their technical skills, they have greatly speeded our program. We hope that some will continue in research upon completion of their studies.

Kirksville College of Osteopathy and Surgery

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The Use of Tetraethylammonium Chloride in Headache

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Despite great diagnostic and therapeutic advances in the medical specialties, headache remains among the most distressing, most common and yet the most elusive symptoms which the physician is called upon to treat.

Objective criteria in the diagnosis of headache are poorly defined. Therefore, subjective descriptions, often unreliable, together with the physician's estimate of the patient, become the chief guides to the diagnosis and management of headache. This situation has led to the utilization of practically every diagnostic and therapeutic measure in the physician's armamentarium. Even with this wealth of science at his command, it has often been the physician's ingenuity alone which has led to the successful management of many cases of headache.

CLASSIFICATION OF HEADACHE

There is no place in this paper for the detailed classification of headache or of its causes. However, consideration of any mode of therapy of so complex a symptom should include mention of some fundamental classifications and some physiodynamic essentials.

Wolff[1] classifies headaches, in order of frequency of occurrence, as follows: migraine; headaches due to anxiety-produced and sustained muscular contractions of the scalp and neck; those associated with fever and septicemia; those resulting from nasal and paranasal, aural, ocular, and dental diseases; hysterical headaches; and, least common, headaches caused by meningitis, intracranial aneurysm, and tumors and abscesses of the brain. Butler and Hall[2] classify headaches into the following physiological groups: (1) vascular, including migraine, histamine, vasodilator, and tension-produced headaches; (2) psychogenic; (3) intracranial traction; (4) extracranial, cranial or cervical nerve irritation; (5) traction and nerve irritation; and (6) mixed (toxic).

Classifications such as these would seem to have clinical value in the light of present information. However, as systematic investigation and scientific knowledge advance, concepts of the nature of headache will be necessarily modified.

MECHANISM OF HEADACHE

If our present day knowledge concerning the genesis and maintenance of headache could be summarized, it might be stated that review of the work of many authors seems to emphasize two salient principles, first, that most headaches have a vascular component in their production, and second, that psychic and emotional forces appear to influence all other factors in the production and maintenance of headache.

The altered physiology in headache is considered to be mostly intracranial, although there are a few extracranial pain-sensitive structures which give rise to headache when stimulated. Within the cranium, pain-sensitivity is seated largely around the larger arteries and over the venous sinuses, in the falx, and in the tentorium. Pain from these structures is produced by distention (of vessels) or by traction. Fibers mediating the pain are derived from the intracranial branches of the trigeminal nerve.

Traction on the intracranial pain-sensitive structures is most commonly produced by space-taking lesions, such as tumor, subdural hematoma, and other forms of hemorrhage. Vascular distention is a much more frequent source of pain, both in itself and in combination with other mechanisms such as spasm and edema of cervical musculature and the vertebral lesion. This disturbance of vascular caliber within the cranium is the result of direct action of toxins, of nervous reflexes mediated over various pathways, and of humoral influences. Examples of the last are headaches accompanying gastrointestinal distention, mediated over the vagus nerve and thence through ganglionic connection to the trigeminal, or dilatation of the branches of the external carotid in response to the effect of histamine or histamine-like substance, which probably occurs in migraine headache. Further, vasomotor instability is a feature of the "tension personality," found in patients suffering from psychosomatic or tension headache. The neurovascular mechanism is disturbed in the post-traumatic syndrome, where headache is often recurrent and very

refractory and may be sustained by reflexes set up by spasm of skeletal musculature.

The problem of the precise mechanism of the production of headache in many clinical entities, such as hypertension, remains unsettled. However, altered arterial caliber, intracranial and extracranial, is usually included in hypothetical explanations.

USE OF ETAMON

This presentation deals with the use, on a purely empiric basis, of tetraethylammonium chloride (Etamon, Parke-Davis) in the symptomatic treatment of headache of the variety which might be termed vascular or functional.

The group of cases so treated included 9 cases of migraine, 4 at onset of the attack (vasoconstrictive phase) and 5 at the height of the attack (vasodilator phase); 8 cases of tension headache, 5 of these probably being purely emotional or psychogenic and 3 associated with the climacteric; 4 cases of hypertensive headache; 2 cases of post-traumatic headache; 2 cases of headache associated with Ménière's syndrome; and 2 cases of histamine cephalalgia. Organic cranial disease, neurological disorder, and skull fractures were ruled out in most cases by roentgenography and other appropriate examinations.

All cases in this group had first been treated for the same complaint on at least three previous occasions by osteopathic manipulation in conjunction with one of the following: Gynergen, sodium nicotinate, antihistamines, and Cafergone (caffeine with ergotamine tartrate, Sandoz).

Tetraethylammonium chloride was injected intramuscularly in all cases. The average dose used was 800 mg. (8 cc.). Procaine hydrochloride, 2 cc. of a 2 per cent solution, was incorporated in the injection. One half of each dose was given in each buttock. None of the patients required more than one administration except those with post-traumatic headache and histamine cephalalgia. These 4 patients required two injections each, given 72 hours apart. Marked improvement was noted after the first injection, however.

All patients reported that relief was much more rapid and complete with injection of tetraethylammonium chloride than with any other method of treatment they had experienced. All the patients with migraine treated at the outset of an attack reported that the drug aborted the episode readily. Patients receiving injections at the height of a migraine episode stated that the intensity of headache was momentarily aggravated but soon gradually abated. The consensus was that the duration of these attacks was from one third to one half shorter than was usual.

Side effects following the use of tetraethylammonium chloride were numerous but inconsequential. They apparently were due largely to the widespread effects of the drug on the autonomic nervous system. Postural hypotension, rise in pulse rate, decreased tonus of the urinary bladder, and a general relaxation or slight drowsiness were consistently noted. A transient disturbance in visual accommodation was reported by 4 patients.

None of the side effects lasted over 60 minutes. Some local irritation at the site of injection was reported but was deemed insignificant by the patients.

TYPICAL CASE REPORTS

Case 1. A white male, aged 59, suffered from recurrent headaches for many years. They were worse on one side, were usually associated with nausea but not with vomiting, and were frequently accompanied by visual disturbance. The patient complained of a feeling of bulging of the eye. Physical findings were generally normal and tests for hyperinsulinism proved negative. It was found that the headaches were associated with anxiety and frustration due to long-standing business dissatisfaction. A diagnosis of migraine was made.

The usual therapies proved unsuccessful, and Etamon, 400 mg. in each buttock, was given. The patient was instructed to lie supine for 30 minutes following the injections. Complete relief of the feeling of bulging and headache resulted, leaving a slight "dull feeling" as the only complaint.

Case 2. A white male, aged 44, had had recurrent attacks of migraine for 20 years, associated with an emotional disturbance. A true hemicrania existed: the headaches were preceded by auras and were accompanied by a feeling of bulging of the eye, nausea, and vomiting. Physical examination showed only a moderate obesity and atony of the gallbladder.

The patient was unresponsive to treatment with all drugs tried. Temporary, partial relief was achieved with osteopathic manipulation. Etamon, 1,000 mg., aborted two attacks during the aura and terminated two episodes at their height.

Case 3. A white female, aged 20, had severe incapacitating headaches with dizziness and nausea 3 weeks after a sharp injury to the vertex of the skull. Osteopathic manipulative treatment was the only therapy that relieved the headaches until tetraethylammonium chloride was tried. Two doses of 800 mg. each, given 48 hours apart, completely abolished the headache and vertigo.

Case 4. A white male, aged 35, complained of headaches over the right maxillary area and forehead and behind the right eye. He felt a tingling sensation over the forehead and vertex, and noticed that reddened, puffy, pruritic, urticaria-like areas appeared above the right eye during the course of an episode. Copious lacrimation and rhinorrhea appeared at the height of discomfort, after which the pain subsided. The headaches occurred in episodes of 1 to 2 hours.

Physical examination, including roentgenograms of the nasal accessory sinuses and skull and allergy tests, proved to be completely negative. A diagnosis of histamine cephalalgia was made. Antihistamines were given, but produced no results. Slight relief of symptoms was obtained from osteopathic manipulative therapy. A dose of 1,000 mg. of tetraethylammonium chloride reduced the episode and its intensity by at least two thirds, and a second dose of the same size, given 48 hours later, abolished all discomfort and all manifestations of the condition.

TETRAETHYLAMMONIUM CHLORIDE

Observations on the effects of the tetraethylammonium ion were made as early as 1914, when Marshall[3] noted its circulatory effects. Burn and Dale[4] in 1915, recorded the ganglionic blocking effect of the drug. More recently other workers have investigated the specific effects of the drug. Acheson and Moe[5] demonstrated the ability of tetraethylammonium salts to block impulses at all autonomic ganglia, both sympathetic and parasympathetic. They noted its inhibitory action on acetylcholine and nicotine. Another interesting effect recently described is the action of the salts in blocking cutaneous axon reflexes for sweating and pilomotion.[6] Also, its ability to produce peripheral

vascular dilatation with increased blood-flow through the extremities has been amply demonstrated by clinicians working with vascular occlusive disease.

There has been ample evidence to show that tetraethylammonium is able to abolish pain that is not of ischemic or anoxic origin. Sborov and Bluemle[7] have used one injection of 200 mg. of the drug to produce almost immediate relief of pleuritic and epigastric pain following transthoracic liver biopsy. Prompt relief of pleuritic pain was also demonstrated by Israel and his coworkers.[8] The pain of herpes zoster and of reflex sympathetic dystrophy has been adequately managed with the use of tetraethylammonium.

The application of these recognized effects of tetraethylammonium to relief of "functional" or "vascular" headache poses a provocative problem. In some respects, the effects observed appear paradoxical. Most authors are agreed that headaches classified as migraine, tension, et cetera have their origin in localized vasodilatation. The recognized physiologic effects of tetraethylammonium are brought about eventually through vascular relaxation and dilatation. Thus, superficially, it would appear from these facts that any clinical symptom produced by decreased vessel tonus would be aggravated rather than ameliorated by the administration of tetraethylammonium.

A satisfactory explanation of the beneficial effects of this drug in the treatment of headache is not immediately apparent. One may postulate that the generalized vasodilatation it produces promotes a more even distribution of blood throughout the entire vascular structure, thereby reducing localized intracranial pooling with its resultant circumscribed vascular distention. This hypothesis requires further clinical investigation, possibly with the aid of arteriography.

Further explanation of the pain-relieving properties of tetraethylammonium may be suggested by the results of several very recent physiological experiments, in which it was shown that this drug raises the threshold for superficial pain but lowers that of sympathetic pain. The abolishing of the superficial pain is probably not due to the ganglionic blocking action of the drug, since such action would necessarily block all pain. Other explanations must be sought. The fact that tetraethylammonium produces some drowsiness might indicate a central depressive action, like that of a general anesthetic. This is not likely to be the case, however, since the relief of superficial pain persists long after drowsiness disappears. The blocking action in the skin might be due to blocking of skin receptors, either by direct action on a nerve ending or by neutralization of a chemical mediator. Further, the preparation may have a selective inhibiting action on isolated cortical or thalamic centers responsible for pain transmission, thus affecting individually the various pain thresholds, superficial, sympathetic, and deep. Such selectivity characterizes the action of drugs like Dilaudid, heroin, and methadon. Without speculating further, it must be admitted that any specific pain-reducing action of tetraethylammonium is unrecognized at this time.

Accepting the view that most headaches are of vascular origin, with the knowledge that the cranial vessels are under nervous control, it is reasonable to assume that headache may be produced through a chain of nervous reflexes from various points in the body and from reflex action during emotional excitement. It can then be seen how tetraethylammonium, through its ganglionic blocking properties, might disrupt a reflex pathway at one or several points, preventing cranial vascular alterations, thus precluding the symptom of headache.

CONCLUSIONS

Relief rather than true cure of most types of headache still remains the prime objective of the internist at this time. An interesting aspect of the problem, the use of tetraethylammonium chloride in management, has been superficially presented here. Although a high percentage of good results was obtained in our group of cases, the number of patients is very small and adequate controls are lacking. Thus, no conclusions can be drawn at this time regarding the efficacy of the drug in headache. The uses of the preparation are limited because of the numerous side effects and because of the necessity for parenteral administration.

Tetraethylammonium might be of particular interest to the osteopathic school of medicine, since its effects are mediated along the identical pathways over which the benefits of osteopathic manipulation are presumed to be transmitted and because the end-organs finally affected are essentially the same. Further study of the effects of the tetraethylammonium ion might conceivably add to our knowledge of the pathogenesis of certain symptom complexes via the autonomic nervous system.

SUMMARY

1. Tetraethylammonium chloride (Etamon) was used in the symptomatic treatment of 27 cases of headache, with almost 100 per cent good results.

2. Probable mechanisms of the effects of the drug have been discussed.

3. The limited number of cases treated, the lack of adequate controls, and the side effects of the drug necessarily preclude definite conclusions regarding the drug at this time.

99-03 67th Ave.

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OSTEOPATHIC RESEARCH

The basic ideas of modern research were not formulated or defined until the middle of the nineteenth century. Today, a century, more or less, later, research constitutes one of the most important spheres of man's activities. It is dominant in the economic, defense, and educational phases of existence. It is of particular importance in medicine.

While the interest of the osteopathic school of medicine in research is by no means confined to the fields of the osteopathic lesion and osteopathic manipulative therapy, its beliefs and aims concerning them have been well expressed by S. V. Robuck[1] Chairman of the Osteopathic Research Board:

> The osteopathic profession is not satisfied with the experience of witnessing improvement or recovery following the application of osteopathic manipulative therapy. It believes that with a clearer understanding of the mechanism and the biochemical and bioelectric phenomena involved in the osteopathic lesion complex and syndrome, much more can be accomplished by this modern approach to treating the sick than has been possible up to now.

Progress in investigations relating to structural defects and their mechanisms and complications is detailed in a Symposium which is published in this issue of THE JOURNAL. This Symposium comprises reports by J. S. Denslow, Price E. Thomas, and Irvin M. Korr concerning methods used and findings made in a long range survey being carried out at the Kirksville College of Osteopathy and Surgery. A preliminary report[2] stated the purpose of this survey.

As a result of the work covered in "An Approach to Skeletal Components in Health and Disease," Dr. Denslow states:

> . . . it seems impossible to escape the conclusion that there is a direct relationship between the good "physical integrity," the normal tissue texture, and the absence of hyperesthesia in one group, and a similar relationship between the demonstrable clinical problem and the widespread tissue texture abnormality and hyperesthesia in the other group.

Dr. Thomas, in his "Approach to the Analysis of Spinal Stress Through its Physiological Manifestations," discusses the use of new and objective methods of studying autonomic imbalance at the segmental level and its possible origin in structural abnormalities. Because many disease syndromes are the consequence of autonomic imbalance, the establishment of a causal relationship between altered sympathetic function and structural deviations may provide a key to the causation of these diseases.

The investigations, on which Dr. Thomas gives a preliminary report, are based on the determination, in a large number of subjects, of the distribution of the various reliably measured physiopathological manifestations and the degree of correlation between these entities and the nature and segmental location of hypothesized stresses. A radiologic method being developed for investigating the influence of soft tissues during adjustments to bilateral symmetrical stresses is presented.

Dr. Korr discusses three fundamental problems of osteopathic research which he designates as (1) the osteopathic lesion, (2) the time factor, and (3) factors which decisively influence the lesion process. These problems he considers as central to thousands of others which the osteopathic profession encounters in practice. The solution of central problems will provide the bases for solution of numerous peripheral ones.

Dr. Korr describes and provides illustrations of methods that are being adapted and developed in the Department of Physiology of the Kirksville College. These methods are characterized by a high degree of objectivity and precision and they are applicable to study of the osteopathic lesion complex in the human body.

The evidences of progress so clearly discernible in these reports should inspire new or renewed interest in research in osteopathic physicians. The research program of the profession, of which the Kirksville survey is but one part, is expensive. As research develops and expands it will be still more expensive. Although osteopathic research has in the main been financed by the American Osteopathic Association and individual members of the profession, the United States Public Health Service has since 1947 made several grants which have aided materially in important undertakings. Recently 90 per cent of the returns from the Christmas Seal Campaign have been allocated for research. Funds from these sources have been substantial, but inadequate to meet present and growing needs. The Seal Campaign, to which contributions can be made at any season, offers a convenient means for making repeated gifts and one in which it should be easy to interest patients and friends.

The need for osteopathic research remains great. Dr. Robuck[1] stated it well:

> At the present, there is urgent need for increased funds to make it possible to utilize fully the available personnel for investigations which will contribute to the knowledge of the osteopathic lesion in particular and to the usefulness of the osteopathic school of medicine in general.

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CANCER TEACHING GRANTS TO OSTEOPATHIC COLLEGES

On March 7, 1951, the Federal Security Agency announced cancer teaching grants of $25,000 and $20,000 respectively to the Des Moines Still College of Osteopathy and Surgery and the College of Osteopathic Physicians and Surgeons. Grants to other osteopathic colleges are pending. Further details are given in the columns of the Department of Public Relations on pages 423 and 424 of this JOURNAL.

The Congress has made monies available for cancer teaching programs on the general understanding that in the fight against cancer the first physician who sees the patient must have knowledge of every development concerning etiology, diagnosis, and therapy if he is to provide life-saving guidance and care. However good the undergraduate teaching concerning cancer may have been in many schools in the past, few are now able to supply the added teachers, laboratories, and clinical facilities needed to keep pace with the demands occasioned by the increased interest in cancer. Public Health Service grants are making it possible to give the necessary instruction. Future generations will profit.

R. C. McCAUGHAN, D.O.

THE 1951 DIRECTORY

The 1951 DIRECTORY OF OSTEOPATHIC PHYSICIANS published by the Association is well on its way and has probably reached many members of the Association. The compilation of such a volume, based on laboriously maintained records of professional personnel, is no small undertaking. The Membership Department in Central Office under the capable direction of Miss Caroline Wells works steadily the year around to keep up-to-date information on every doctor of osteopathy. Preparation involves consultation with secretaries of the divisional societies in order properly to accredit current membership in those organizations.

The book is constantly used by members in their reference of traveling patients. Insurance companies—life, industrial, accident, and health, Blue Cross and Blue Shield insurance plans, state and national governmental health agencies, libraries, advertisers, and many other agencies and individuals use the book for references. The DIRECTORY is supplemented by a monthly correction service available to advertisers and divisional society secretaries.

Members of the Association are listed in alphabetical order and again in their proper geographical location. For members, the school and year of graduation and specialty certification are noted where indicated. Nonmembers of the Association are listed in a separate geographical listing.

The statistics this year indicate the largest number (8,003) of members of the Association in its history. There are more doctors of osteopathy (11,400) in practice than ever before. The increase over last year is 150. Thus the trend to a steady increase in numbers of osteopathic physicians and surgeons resumes the pattern of many years, a pattern interrupted in the last 3 years by the diminished number of graduates. It will be remembered such drop in the number of graduates was incident to discontinuation, by the government, of deferment of preprofessional students in the period when recent graduating classes were matriculating in osteopathic colleges or preparing to do so via their preprofessional college work. The attrition due to deaths or retirement for other reasons has not caught up to the increase. Such a time may come unless a way to finance larger or added schools can be devised.

Membership in divisional societies is also at a high level (8,473). The largest membership in a division, as indicated by the starring system (*), is that of California (1,283). Next comes Michigan (834) followed by Missouri (767) and Pennsylvania (679). The total osteopathic population is largest in California (1,897). Missouri is second with 1,116, Pennsylvania third with 997, and Michigan fourth with 959 listed physicians.

California again leads in number of members in its state association (1,380). Missouri is in second place with 966 and Michigan in third with 836 members.

There are still altogether too many doctors of osteopathy, licensed to practice, who enjoy that right in large part because of the collective efforts of the Association and its constituent divisional societies and who still fail to support, through membership, those organizations. The psychology involved in nonmembership in a professional organization to which one is eligible must be materially confused. There are legitimate reasons why a few qualified D.O.'s cannot undertake membership responsibilities or cannot carry the full load. To a great extent osteopathic organizations have made membership available to those who have legitimate reason for nonsupport. But by and large, nonmembership results from lack of appreciation and understanding of the role and the accomplishments of organized osteopathy or from deliberate refusal to carry the load of professional responsibility. Members, on that basis, should use every legitimate and reasonable means of bringing nonmembers into the cooperative efforts of the members of the profession.

Next year's DIRECTORY should show even a better situation and the efforts of the Committee on Membership under the experienced and able direction of Chairman Stephen B. Gibbs will be directed to that end.

The DIRECTORY is not confined to listing of Doctors of Osteopathy. The Constitution and By-Laws and the Code of Ethics of the Association are made available therein. Officers, departments, bureaus, committees, and affiliated and allied groups are listed. Information is given concerning the approved osteopathic colleges, specialty certifying boards, specialty colleges, fraternities and sororities, alumni associations, and boards licensing osteopathic physicians. The Registry of Osteopathic Hospitals, covering hospitals approved for training interns and approved residency training programs, is included. The president and secretary of each divisional society are properly identified.

Altogether, the DIRECTORY is an imposing compendium of information about the osteopathic profession and it will, as usual, meet the interested perusal of every member of the Association.

R. C. McCAUGHAN, D.O.

Proposed Amendments to the Constitution and Bylaws of the American Osteopathic Association

R. C. McCAUGHAN, D.O.
Executive Secretary

(References to articles and sections are to the edition of the Constitution and Bylaws in the Directory of Osteopathic Physicians, 1951, published by the Association.)

CONSTITUTION

(The following proposed amendments to the Constitution are published at the direction of the House of Delegates. They are for the purpose of distinguishing between the words "sessions" and "meetings" and can be acted upon by the House in 1951. The first proposed amendment contains also a suggested change, from two to five, in the number of convention cities which may be selected by any one House of Delegates.)

Article IX—Sessions

Amend by deleting the word "sessions" in the title and in the first sentence of the Article and by substituting therefor the word "meetings."

Amend by deleting, in the second sentence, the word "two" and substituting therefor the word "five."

The Article will then read: "Article IX—Meetings. The annual meetings shall be held at such time and place as may be determined by the House, but such time and place may be changed by the Trustees should necessity warrant. In selecting the convention city, the House may take action covering not more than five succeeding conventions."

Article X—Amendments

Amend by deleting the word "session" wherever it is used in the Article and substituting therefor the word "meeting."

The Article will then read: "This Constitution may be amended by the House at any annual meeting, by a two-thirds vote of the accredited voting Delegates at such meeting, provided that such amendments shall have been presented to the House and filed with the Secretary at a previous annual meeting, and that the Secretary shall have them printed in THE JOURNAL not less than two months nor more than four months previous to the meeting at which action thereon is to be taken."

Department of Professional Affairs

ALLAN A. EGGLESTON, D.O.
Chairman
Montreal, Canada

RULES CONCERNING A.O.A. CONVENTION INVITATIONS

With regard to the formal invitation to this Association to hold an annual convention in a particular place, the Constitution of the American Osteopathic Association provides that "the House may take action covering not more than two succeeding conventions." Therefore, it will be possible, but not mandatory, for the House of Delegates at the forthcoming 1951 convention in Milwaukee to select the convention city for 1953. (The 1952 convention is already assigned to Atlantic City.)

Formal invitations must be received not less than sixty days before the convention and in such invitation the inviting city is required to give detailed description of physical facilities available and of a local organization now set up or to be set up. This descriptive information is an essential part of the convention invitation, and failure to provide it will bar consideration of the invitation by the Convention City Committee and by the House of Delegates. The Convention City Committee is composed of Hooker N. Tospon, Chairman, Vernon F. Still, Alden Q. Abbott, C. N. Clark, and R. C. McCaughan.

Following are the formal rules involved:

"The invitations shall be received not less than sixty days before the time of selection of convention city so that plenty of time may be afforded to investigate. Inviting cities shall in their invitation give detailed description of physical facilities and of their local organization. These descriptions shall be exact and failure to provide this information to the Committee shall bar consideration of the invitation by the Committee and the House of Delegates.

"The Committee shall report its findings, recommendations, and reasons therefor, to the Board and the House of Delegates early in the annual sessions each year so that adequate time can be had for discussion before decision is arrived at on location by the House. The House shall give serious consideration to the recommendation of the Committee. The Committee may recommend one city or more than one if two alternatives seem equally acceptable. In selecting a convention city for recommendation, the Committee shall consider the following factors listed in the order of their importance:

(a) Physical facilities for general and sectional and affiliated groups' programs, and for housing attendants.
(b) Location of city for drawing the largest attendance.
(c) Clinical facilities (legal status of profession).
(d) Location of city as drawing card for exhibitors.
(e) Physical facilities as a drawing card for exhibitors.
(f) Expense to the Association in putting on convention.
(g) Intraprofessional good will promotion, here considering location and success of previous convention.
(h) Public relations of the profession.
(i) Ability of the local group to provide necessary local committee.
(j) Available entertainment for members' families.

"Divisional societies or associations extending convention city invitations shall be requested to give detailed description of physical facilities of their city and their local organization. All such communications shall be presented to the Convention City Committee not less than sixty days before the time of selection of the convention city."

R. C. McCAUGHAN, D.O.
Executive Secretary

ADVISORY BOARD FOR OSTEOPATHIC SPECIALISTS

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St. Louis

ANNUAL REGISTRATION FEE FOR CERTIFIED SPECIALISTS

During the December, 1950, meeting of the Board of Trustees of the American Osteopathic Association, the following recommendation was approved:

That the annual registration fee for each certified specialist be raised from $5.00 a year to $10.00 a year, and that $5.00 of this registration fee be retained by the American Osteopathic Association and that $5.00 be returned to the respective certifying boards for continuation of their work, and that in case of joint certification, $2.50 be returned to each of the respective boards.

AMERICAN OSTEOPATHIC BOARD OF OBSTETRICS AND GYNECOLOGY

Examinations of applicants for certification will be held at the Statler Hotel, Detroit, February 9, 10, 1952. Address the secretary, Dorothy J. Marsh, D.O., 609 S. Grand Ave., Los Angeles 14.

AMERICAN OSTEOPATHIC BOARD OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

The officers are: Chairman, Edward W. Davidson, Los Angeles; vice chairman, C. Paul Snyder, Philadelphia; secretary-treasurer, Ralph S. Licklider, Columbus, Ohio.

Dr. Licklider is chairman of the credentials committee.

Other members of the Board are Frank Winston Paul, Detroit, Lyman A. Lydic, Dayton, Ohio, and Preston J. Stack, Los Angeles.

AMERICAN OSTEOPATHIC BOARD OF RADIOLOGY

The officers are: Chairman, Eugene R. Kraus, New York; vice chairman, Arthur H. Witthohn, Grand Rapids, Mich.; and secretary-treasurer, Jack H. Grant, Chicago.

Additional members are C. A. Tedrick, Phoenix, Ariz., M. Carman Pettapiece, Portland, Maine, and Clyde C. Henry, Denver, Colo.

COMMITTEE ON SPECIAL MEMBERSHIP EFFORT

STEPHEN B. GIBBS, D.O.
Chairman
Coral Gables, Florida

WHAT IS THE POINT?

Many members of the osteopathic profession have doubtless taken the Dale Carnegie course in public speaking. This course is worth while and among other things teaches the importance of having a point and making that point when there is something to say. In learning to speak with brevity, the student often is asked "What is the point? What do you want your hearers to do?" If there was ever a time when we need brevity and clarity of thought, it is now. "What is the point?" should be the question in affairs of our country and in all things pertaining to the osteopathic profession.

Many reasons have been advanced as to why every osteopathic physician should belong to the American Osteopathic Association. However, the trite statement, "United we stand, divided we fall," is most applicable now. The press of world events affecting the affairs of our country and its very mode of existence must not be allowed to catch the profession asleep or with its guard down. "What is the point?" If every D.O. were to consider every type of legislation in connection with the osteopathic profession and ask, "What is the point?", the result would be whole-hearted 100 per cent membership in the American Osteopathic Association.

The reasons for total membership are so obvious that it is unnecessary to enumerate them. A moment's study will bring to mind an abundant number. Increased membership has brought and will continue to bring gains in standing in the national legislative picture, increased participation in all phases of the public health and welfare, greater success of the osteopathic colleges in their efforts to maintain high educational standards, improvements in osteopathic hospital service. These are reasons to support the point that *every D.O. must belong to the American Osteopathic Association.* And every one of these reasons could be the source of an infinite number of answers to "Why A.O.A. membership?"

The Dale Carnegie sequence relating to every type of discourse, whether short or long, proceeds from "What is the point?" to "What do you want your audience to do about it?" I will tell you what to do: Maintain your own membership and sell membership to the nonmembers.

"What is the point?" *Every D.O. must belong to the A.O.A. for professional survival.*

ROBERT D. MCCULLOUGH, D.O.
Chairman, Bureau of Professional Development

MEMBERSHIP REPORT AS OF APRIL 1, 1951

Membership Count, March 1, 1951		7,909
Applications received in March, 1951	9	
Graduates licensed in March, 1951	35	44
Deaths in March, 1951		5
Gain in March, 1951		39
Membership Count, April 1, 1951		7,948

HONOR ROLL

H. Freeman Elliot — Dorothy J. Marsh

Department of Public Affairs

JOHN W. MULFORD, D.O.
Chairman
Cincinnati

BUREAU OF PUBLIC EDUCATION ON HEALTH

JOHN P. WOOD, D.O.
Chairman
Birmingham, Mich.

NEW PUBLIC HEALTH LAWS

With some forty-six state legislatures scheduled to convene during the year 1951, the introduction into the legislatures of many bills affecting the public health was expected. At this date, most of the legislatures are still in session and the number of bills affecting the public health which will be enacted into law has not yet been determined. Two of the bills which were introduced affecting the public health have already been enacted into law and signed by the governors of the states. These two bills are of interest to the members of the osteopathic profession inasmuch as they affect the requirements and standards for the licensing of physicians and surgeons holding the degree of Doctor of Osteopathy in these two states. They are, therefore, brought to your attention at this time. At a later date, other bills having a similar effect upon the licensing of members of the osteopathic profession or upon the public health of the various states will be commented upon.

Colorado.—In Colorado the legislature enacted into law Senate Bill 216, which repealed the present medical practice act of the state of Colorado and substituted for the old act a new medical practice act which raises the standards for licensure of persons seeking a license to practice medicine and surgery and makes more clear and explicit the administrative powers of the Colorado state board of medical examiners and its powers in regard to the enforcement of the act. The Colorado state board of medical examiners, it is provided, shall be comprised at all times of seven members having the degree of Doctor of Medicine and two members having the degree of Doctor of Osteopathy. In order for a person to be licensed in the state, he must present evidence of having graduated from an approved medical college, have completed an approved internship of at least 1 year, and present to the board a valid, unrevoked certificate issued by the state board of examiners in the basic sciences. Section 8 defines "approved medical college" as "a college which conforms to the minimum educational standards for medical colleges or for osteopathic colleges, as established respectively by the American Medical Association and by the American Osteopathic Association, or a college which is approved by either of said Associations; provided, however, that the Board shall have the authority, upon its own investigation of the educational standards and facilities thereof, to approve any other medical college." An "approved internship" or "approved residency" is defined in a similar manner. Section 7 of the bill permits the issuance of a license by the board upon the basis of (a) the passing by the applicant of an examination, (b) the presentation of a certification of record or other certificate of examination issued to the applicant by the National Board of Medical

Examiners or by the National Board of Examiners for Osteopathic Physicians and Surgeons, or (c) the presentation of a valid and unrevoked license or certificate issued by a duly constituted examining board of any other state or territory of the United States or the District of Columbia whose licensing standards at the time such license or certificate was issued were not substantially lower than those of the state of Colorado at the time for the granting of a license to practice medicine. All applicants who are issued a license by the board receive a license to practice medicine and surgery and shall be accorded equal rights and privileges under all laws of the state of Colorado.

West Virginia.—Senate Bill No. 4, enacted into law by the legislature of West Virginia, amended the osteopathic practice act of the state. Section 3 of the act clarifies the provisions in regard to the appointment of the members of the West Virginia board of osteopathy. Section 5 sets out the examination subjects for a license "to practice medicine and surgery as an osteopathic physician and surgeon." An applicant for examination must present evidence that he has completed 2 years of preprofessional college training, graduated from an approved osteopathic college, and completed an internship in a hospital approved for intern training. An "approved hospital for intern training" means "a hospital approved for intern training by the board or by the hospital accrediting agency of the American Osteopathic Association." Section 6 amends the osteopathic practice act so as to permit the issuance of a license upon the basis of a certificate issued by the National Board of Examiners for Osteopathic Physicians and Surgeons in addition to the already existing right of the board to issue a license upon the basis of a license issued by a duly constituted licensing board of another state. Section 8 permits the issuance of temporary permits to practice in areas where medical services are needed as determined by the board. A temporary permit is effective only until the holder of a temporary permit has either been granted or denied a license at the next regular meeting of the board. Section 10 of the act now requires that every holder of a license to practice as an osteopathic physician and surgeon shall annually on or before July 1 of each year renew his license by paying to the secretary of the board an annual renewal fee of two dollars. As a prerequisite to renewal of a certificate of license issued by the board, "each holder of such a certificate shall furnish annually to the secretary of the board satisfactory evidence of having completed a two-day educational refresher training course conducted by the West Virginia Osteopathic Society, Inc., under the supervision and control of the board or conducted by its equivalent as determined by the board." Failure to renew a certificate of license operates as an automatic suspension of the rights and privileges granted under the license. A license suspended by failure to comply with the requirement of annual renewal may be reinstated by the board upon the compliance with requirements set out in this section.

Department of Public Relations

CHESTER D. SWOPE, D.O.
Chairman
Washington, D. C.

PREOSTEOPATHIC G. I. BILL STUDENTS

An official Veterans Administration release dated March 5, 1951, announced that veterans taking preosteopathic training and unable to enter accredited osteopathic schools by the generally applicable cut-off date of July 25, 1951, will be permitted to start their professional training after the deadline date. The official release reads as follows:

Veterans Administration will give special consideration to pre-osteopathic GI Bill students unable to enter accredited osteopathic schools by the July 25, 1951, training cut-off date.

Veterans who complete pre-osteopathic courses under the GI Bill will be permitted to start their osteopathic training whenever an accredited school has room for them—even if it is after the deadline date.

They must, however, establish the fact that they applied for admission each year after completing their preliminary training under the GI Bill.

The special provision will apply, V-A said, regardless of whether a veteran's pre-osteopathic training ended before or after July 25, 1951.

The pre-osteopathic provision is similar to that now in effect for pre-medical and pre-dental GI Bill students unable to go ahead with advanced training because of overcrowded conditions in accredited medical and dental schools.

They, too, may take their medical and dental school training after the cut-off date, so long as they show they have applied each year after finishing their preliminary schooling.

The July 25, 1951, cut-off date applies to veterans discharged before July 25, 1947. Veterans discharged after the 1947 date have four years from discharge in which to start GI Bill training.

No GI Bill training may be obtained after the wind-up of the program on July 25, 1956, V-A said.

NEW NCI CONTROL CHIEF

Appointment of Dr. Raymond F. Kaiser as Chief of the Cancer Control Branch, National Cancer Institute, has been announced by Surgeon General Leonard A. Scheele. Dr. Kaiser succeeds Dr. Austin V. Deibert, who has been named Public Health Service Liaison Officer in the Economic Cooperation Administration.

Formerly Assistant Chief of the Cancer Control Branch, Dr. Kaiser will be responsible for State grants-in-aid, special control and teaching grants, consultation services, demonstration projects, and professional education. These services were developed by Drs. Kaiser and Deibert in 1946 as the first official national cancer control program in the United States.

Dr. Kaiser received his M.D. degree from the University of Colorado in 1937, and his M.P.H. from Harvard in 1942. He began his PHS service in 1937, served in PHS hospitals, was ship surgeon in the Aleutian Islands, associate health officer in Forest County, Mississippi, and consultant in PHS regional offices.

OSTEOPATHIC COLLEGES AWARDED CANCER GRANTS

An official Federal Security Agency release dated March 7, 1951, made public government allocation of cancer teaching grants under approved applications of two colleges of osteopathy. The text of the release is as follows:

FEDERAL SECURITY AGENCY
Public Health Service
National Institutes of Health
National Cancer Institute

Public Health Service grants of more than half a million dollars have been made by the Cancer Institute of the National Institutes of Health to improve the cancer training of future physicians, dentists, and osteopaths, Federal Security Administrator Oscar R. Ewing announced today.

Grants to two colleges of osteopathy marked the first time that such institutions have been included in the Public Health Service program of aid to professional schools. An award of $25,000 went to the Des Moines Still College of Osteopathy and Surgery, Iowa, and $20,000 to the College of Osteopathic Physicians and Surgeons in Los Angeles.

The allocations were approved by Dr. Leonard A. Scheele, Surgeon General of the Public Health Service, following recommendation by the National Advisory Cancer Council.

"In awarding teaching grants to schools of osteopathy we are recognizing the plain fact that a great many cancer cases are seen for the first time by osteopaths," Dr. Scheele said. "Since the fate of the cancer patient is often in the hands of the first practitioner he visits, the coming generation of osteopaths should certainly be trained to suspect cancer, to diagnose it if possible, and to refer the patient to specialists whenever necessary. The osteopathic colleges are certainly taking a forward step in strengthening their cancer teaching programs."

Dr. Scheele explained that the funds will enable two of the six accredited schools of osteopathy to employ a full-time coordinator of cancer teaching and several assistants, who will work with a cancer committee consisting of heads of various departments to emphasize the subject of cancer in classroom and clinical instruction.

Additional grants to continue the cancer teaching programs in 18 medical schools and 10 dental schools were also announced. In addition, a teaching grant was made for the first time to Howard

University College of Dentistry, Washington, D. C. With these awards, all but one of the Nation's 79 medical schools, and all but three of its 42 dental schools are participating in the Public Health Service program to strengthen professional training in cancer.

Cancer teaching grants, which were first made in 1947, are renewable annually, and enable schools to engage faculty members to coordinate cancer teaching, to procure cancer training materials, and for similar purposes. Medical and osteopathic school grants are limited to $25,000 annually for 4-year schools and $5,000 for 2-year schools. Dental school grants have a ceiling of $5,000 annually.

Participating schools not included in today's announcement file their requests for aid at different times of the year.

A list of the newly approved teaching grants follows:

TEACHING GRANTS

MEDICAL SCHOOLS

State	Institution and Location	Amount
California	University of Southern California School of Medicine, Los Angeles, Dr. Ian Macdonald	$25,000
	University of California Medical Center, San Francisco, Dr. R. S. Stone	25,000
Georgia	Medical College of Georgia, Augusta, Dr. Hoke Wammock	25,000
Illinois	The Chicago Medical School, Chicago, Dr. Philippe Shubik	25,000
	University of Chicago, Chicago, Dr. Walter L. Palmer	23,652
	University of Illinois College of Medicine, Chicago, Dr. Danely P. Slaughter	25,000
Indiana	Indiana University Medical Center, Indianapolis, Dr. Edwin A. Lawrence	25,000
Iowa	The State University of Iowa College of Medicine, Iowa City, Dr. H. Dabney Kerr and Dr. E. D. Plass	24,876
Massachusetts	Boston University, Boston, Dr. Henry M. Lemon	25,000
Nebraska	Creighton University School of Medicine, Omaha, Dr. James F. Kelly	25,000
North Carolina	The Bowman Gray School of Medicine, Winston-Salem, Dr. Robert P. Morehead	25,000
New York	University of Buffalo School of Medicine, Buffalo, Dr. Glenn H. Leak	25,000
Ohio	University of Cincinnati, College of Medicine, Cincinnati, Dr. B. N. Carter	25,000
Pennsylvania	Women's Medical College of Pennsylvania, Philadelphia, Dr. Mildred C. J. Pfeiffer	25,000
Tennessee	Meharry Medical College, Nashville, Dr. George W. Hilliard	25,000
Texas	Baylor University College of Medicine, Houston, Dr. Berne L. Newton	24,683
West Virginia	West Virginia University, School of Medicine, Morgantown, Dr. Milford L. Hobbs	5,000
District of Columbia	*Howard University School of Medicine, Washington, D.C., Dr. R. S. Jason	31,500*
Total teaching grants to medical schools		$434,711

*Includes supplementary grant of $6,500 for current year.

DENTAL SCHOOLS

State	Institution and Location	Amount
California	University of Southern California School of Dentistry, Los Angeles, Dr. George Sharp	$5,000
Illinois	Loyola University School of Dentistry, Chicago, Dr. Orion Stuteville	5,000
	University of Illinois College of Dentistry, Chicago, Dr. Isaac Schour	5,000
Missouri	Washington University, St. Louis, Dr. Charles A. Waldron	4,590
Oregon	University of Oregon Dental School, Portland, Dr. Harold J. Noyes	4,981
Tennessee	Meharry Medical College School of Dentistry Nashville, Dr. Samuel O. Banks	5,000
Texas	The University of Texas School of Dentistry, Houston, Dr. Levon A. Varteressian	5,000
Washington	University of Washington School of Dentistry, Seattle, Dr. Ernest M. Jones	5,000
Wisconsin	Marquette University School of Dentistry, Milwaukee, Dr. J. M. Gules	5,000
District of Columbia	*Howard University College of Dentistry, Washington, D. C., Dr. Raymond L. Hayes	5,000
	Georgetown University Dental School, Washington, D. C., Dr. V. J. Dardin	5,000
Total teaching grants to dental schools		$49,571

*New grant.

OSTEOPATHIC SCHOOLS

State	Institution and Location	Amount
California	*College of Osteopathic Physicians and Surgeons, Los Angeles; director to be appointed	$20,000
Iowa	*Des Moines Still College of Osteopathy and Surgery, Des Moines, Dr. Stuart F. Harkness	25,000
Total teaching grants to osteopathic schools		$45,000

*New grants.

PRICE AND WAGE STABILIZATION
COMMODITIES AND SERVICES

The Defense Production Act of 1950, approved September 8, 1950, Public Law 774, 81st Congress (60 Stat. 798) authorized the President to stabilize prices and wages. The President by Executive Order 10161, delegated his authority in that respect by creating the Economic Stabilization Agency (ESA) and providing that there should be set up in that Agency an Office of Price Stabilization (OPS) and a Wage Stabilization Board (WSB).

On January 26, 1951, ESA issued a General Ceiling Price Regulation (GCPR). The Regulation established ceiling prices for all commodities and services (except those specifically exempt) upon the basis of the highest prices in effect from December 19, 1950, to January 25, 1951, inclusive ("base period").

Both the Defense Production Act (Sec. 402 (e) (ii) and the GCPR exempt from price control the "Rates or fees charged for professional services."

Section 402 (f) of the Act also provides for exemptions by regulation or order.

WAGES, SALARIES, AND OTHER COMPENSATION

On January 26, 1951, ESA issued General Wage Stabilization Regulation No. 1 providing that no employer shall pay any employee and that no employee shall receive wages, salaries, and other compensation at a rate in excess of the rate at which such employee was compensated on January 25, 1951, without the prior approval or authorization of WSB.

WSB General Regulation No. 5, February 5, 1951, permits merit and length of service increases for individual employees under certain conditions without prior approval of WSB.

WSB General Regulation No. 7 issued February 15, 1951, exempts certain non-profit institutions as follows: "Religious, charitable, scientific, literary, educational organizations, and cemetery companies which are exempt from Federal income taxes under section 101 (5) and (6) of the Internal Revenue Code may adjust the wages, salaries, or other compensation of their employees without prior approval of the Wage Stabilization Board, except as provided in sections 2 and 3."

The text of General Wage Stabilization Regulation No. 1, WSB Regulation No. 5, and WSB General Regulation No. 7 follows:

GENERAL WAGE STABILIZATION REGULATION 1

January 26, 1951

ECONOMIC STABILIZATION AGENCY

WASHINGTON

TITLE 32A—NATIONAL DEFENSE, APPENDIX

CHAPTER II—ECONOMIC STABILIZATION AGENCY

GENERAL WAGE STABILIZATION REGULATION 1

Pursuant to the Defense Production Act of 1950 (Public Law 774, 81st Cong.) and Executive Order 10161 (15 F. R. 6105), *It is hereby ordered,* That rates of wages, salaries and other compensation are stabilized as hereinafter provided.

Statement of considerations. A regulation establishing ceilings on prices of materials and services generally was issued by the Economic Stabilization Agency on the 26 day of January, 1951. The provisions of Section 402 (b) of the Defense Production Act of 1950 require that upon the issuance of such an order wages, salaries and other compensation generally shall be stabilized.

For the purpose of preparing itself for the discharge of its responsibilities the Wage Stabilization Board heretofore distributed to representative labor and industry groups a series of questions, the answers to which would provide the Board with essential information for the development of wage stabilization policies.

Following the distribution of the series of questions, the Wage Stabilization Board conducted conferences which were attended by representative groups of labor and industry which presented their views respecting the development of wage stabilization policies.

The Administrator has this day issued General Ceiling Price Regulation 1 and is required by the Defense Production Act of 1950 to stabilize at the same time wages, salaries and other compensation. This regulation will be modified and implemented, from time to time, as the Wage Stabilization Board develops its wage stabilization policy. The Board will issue regulations governing the procedure for applying for modifications and adjustments.

GENERAL WAGE STABILIZATION REGULATION 1

Sec.

1 General stabilization of wages, salaries and other compensation.
2 Other existing regulations and orders superseded.

(Continued on page 454.)